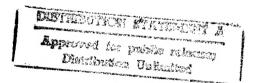
APPENDIX F SYSTEM SIMULATION COMPUTER RUNS

Volume III



DEPARTMENT OF THE ARMY

CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
P.O. BOX 9005

CHAMPAIGN, ILLINOIS 61826-9005

REPLY TO ATTENTION OF:

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17 Sep 1997

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Marie Wakef eld,

Librarian Engineering

Building 201 (Typical for 202, 203, and 204)

Trace Input File

DTIC QUALITY INSPECTED 2

19971017 205

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   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
       01/BENATEC ASSOCIATES
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       01/BUILDING 201
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       08/CARLISLE
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       09/MAY/SEP///APR/OCT
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  10
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  12
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       20/01/1/1ST FLOOR/864/1/2/1/.36/9
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       25/01/1/66.3/1/1/.55/.57
       25/01/3/36/1/1/.55/.57
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 30
       25/01/4/18/1/1/.55/.57
 31
       25/01/6/16/1/1/.55/.57
 32
       25/02/1/73/1/1/.55/.57
 33
       25/02/2/86/1/1/.55/.57
 34
       25/02/3/40/1/1/.55/.57
 35
       25/02/4/24/1/1/.55/.57
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF
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 51
       67/1/EQ2454/1
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       20/01/1/1ST FLOOR/864/1/2/1/.36/9
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       20/02/1/2ND FLOOR/864/1/1/0//8
 57
       21/M///CBLQTX///CBLQTX
 58
       22/02/1/YES////191
```

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CONTENTS OF : E:\CB201.TM
LINE #
  59
       24/01/1/329/1//157/0
  60
       24/01/2/25/2//157/90
  61
       24/01/3/25/7//145/90
  62
       24/01/4/36.5/6//145/180
       24/01/5/36.6/2//157/180
  63
  64
       24/01/6/25/2//157/270
       24/01/7/25/7//145/270
  65
       24/02/1/292/1//157/0
  66
       24/02/2/272/1//157/90
  67
       24/02/3/292/1//157/180
  68
       24/02/4/272/1//157/270
  69
  70
       25/01/1/66.3/1/1/.55/.57
  71
       25/01/3/36/1/1/.55/.57
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       25/01/4/18/1/1/.55/.57
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       25/01/6/16/1/1/.55/.57
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       25/02/1/73/1/1/.55/.57
 75
       25/02/2/86/1/1/.55/.57
       25/02/3/40/1/1/.55/.57
 76
 77
       25/02/4/24/1/1/.55/.57
 78
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF
 79
       27/M/345/SF-PERS/230/190/.5/WATT-SF/INCAND
 80
       29/M//////.33/CFM-SF
       30/M///760/CFM
 81
 82
       SYSTEM - 2
       39/2/WALL & ROOF INSULATION
 83
 84
       40/1/SZ
 85
       41/1/1/1
       42/1/.2/.2
 86
 87
       45/1/OFF/////CBLQHTG
 88
       EQUIPMENT - 2
       59/2/CARLISLE///WALL & ROOF INSULATION
 89
 90
       60/1/1/BLKPLANT/1/1
 91
       62/1/EQ1000/1
 92
       65/1/1//1/1
       67/1/EQ2454/1
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 94
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       LOAD - 3
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 97
       20/01/1/1ST FLOOR/864/1/2/1/.36/9
       20/02/1/2ND FLOOR/864/1/1/0//8
 98
       21/M///CBLQTX///CBLQTX
 99
100
       22/02/1/YES////154
101
       24/01/1/329/1//157/0
102
       24/01/2/25/2//157/90
103
       24/01/3/25/7//156/90
       24/01/4/36.5/6//156/180
104
105
       24/01/5/36.5/2//157/180
       24/01/6/25/2//157/270
106
       24/01/7/25/7//156/270
107
       24/02/1/292/1//157/0
108
       24/02/2/272/1//157/90
109
       24/02/3/292/1//157/180
110
111
       24/02/4/272/1//157/270
112
       25/01/1/66.3/1/1/.55/.57
113
       25/01/3/36/1/1/.55/.57
114
       25/01/4/18/1/1/.55/.57
115
       25/01/6/16/1/1/.55/.57
116
       25/02/1/73/1/1/.55/.57
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CONTENTS OF : E:\CB201.TM
LINE #
117
       25/02/2/86/1/1/.55/.57
118
       25/02/3/40/1/1/.55/.57
119
       25/02/4/24/1/1/.55/.57
120
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF
121
       27/M/345/SF-PERS/230/190/.5/WATT-SF/INCAND
122
       29/M/////.30/CFM-SF
123
       30/M///760/CFM
124
       SYSTEM - 3
125
       39/3/WEATHERSTRIP & CAULKING
126
       40/1/SZ
127
       41/1/1/1
128
       42/1/.2/.2
129
       45/1/0FF////CBLQHTG
130
       EQUIPMENT - 3
131
       59/3/CARLISLE///WEATHERSTRIP & CAULKING
132
       60/1/1/BLKPLANT/1/1
133
       62/1/EQ1000/1
134
       65/1/1//1/1
135
       67/1/EQ2454/1
136
       69/1
137
       LOAD - 4
      19/4/COMPINED ECOS
138
139
       20/01/1/1ST FLOOR/864/1/2/1/.36/9
      20/02/1/2ND FLOOR/864/1/1/0//8
140
141
      21/M///CBLQTX///CBLQTX
142
      22/02/1/YES////191
143
       24/01/1/329/1//157/0
144
      24/01/2/25/2//157/90
145
      24/01/3/25/7//145/90
146
      24/01/4/36.5/6//145/180
147
      24/01/5/36.5/2//157/180
148
      24/01/6/25/2//157/270
149
      24/01/7/25/7//145/270
150
      24/02/1/292/1//157/0
151
      24/02/2/272/1//157/90
      24/02/3/292/1//157/180
152
153
      24/02/4/272/1//157/270
154
      25/01/1/66.3/1/1/.55/.57
155
      25/01/3/36/1/1/.55/.57
156
      25/01/4/18/1/1/.55/.57
157
      25/01/6/16/1/1/.55/.57
158
      25/02/1/73/1/1/.55/.57
159
      25/02/2/86/1/1/.55/.57
160
      25/02/3/40/1/1/.55/.57
161
      25/02/4/24/1/1/.55/.57
162
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF
163
      27/M/345/SF-PERS/230/190/.5/WATT-SF/INCAND
      29/M/////.28/CFM-SF
164
165
      30/M///760/CFM
166
      SYSTEM - 4
167
      39/4/COMBINED ECOS
      40/1/SZ
168
169
      41/1/1/1
170
      42/1/.2/.2
171
      45/1/OFF/////CBLQHTG
172
      EQUIPMENT - 4
173
      59/4/CARLISLE///COMBINED ECOS
174
      60/1/1/BLKPLANT/1/1
```

Building 201 (Typical for 202, 203, and 204)

Trace Output File

```
Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
```

************************ ****************************** ** TRACE 600 ANALYSIS ** ** by *****************

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 201

CARLISLE Weather File Code:

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft)

Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 92 (F) Summer Design Dry Bulb: Summer Design Wet Bulb: 72 (F) 4 (F) Winter Design Dry Bulb: Summer Ground Relectance: 0.20

Winter Ground Relectance: 0.20

0.0742 (Lbm/cuft) Air Density: Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

Time/Date Program was Run: 13: 0:39 1/12/94

Dataset Name: CB201 .TM AIRFLOW - ALTERNATIVE 1 BASE BUILDING

-----SYSTEM SUMMARY -------(Design Airflow Quantities)

٠		Outside	Cooling	Main Heating	Return	Exhaust	Auxil. Supply	Room Exhaust
System Number	System Type	Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)	. Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	0	1,933	1,520	2,769	836	0	0
Totals		0	1,933	1,520	2,769	836	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- Cooling ------ Peating ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 2.3 0.0 0.0 2.3 -90.533 0 0 0 0 -90,533 2.3 -90.533 0 0 0 0 2.3 -90,533 0.0 0.0 0

The building peaked at hour 17 month 7 with a capacity of 2.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

System 1 Peak SZ - SINGLE ZONE

		******** (=>					*	Mo/	Hr:	7/17 *		Mo/Hr	: 13/ 1	
Outside	Air ==>	04	Mo/Hr: ADB/WB/HR:	89/ 72/ 91.	0		*			89		OAD8	•	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sr	ace	Percnt *	Space Po	eak Co	il Peak	Percnt
		Sens.+Lat.		Latent	Total	Of Tot	*	Sensi						Of Tot
Envelope		(Btuh)		(Btuh)		(%)		(Bt		(%) *	•	uh)		(%)
	e Solr	Ó	Ò	,	Ó					0.00		Ó	0	0.00
-	e Cond	0	0		0				0			_	0	
	ond	3,865	0 0 0		3,865	13.83	*	3,	865	14.12 *	-3,	167	-3,167	
Glass	Solar	10,729	0		10,729	38.40	*	10,	729	39.20 *			0	0.00
Glass	Cond	2,699	0		2,699	9.66	*	2,	699	9.86 *		944		14.49
Wall C	ond	5,871	520		6.390	22.87	*	5,	871	21.45 *		510	-12,649	14.17
Partit	ion	0	•		0	0.00	*		0	0.00 *		0	0	0.00
Expose	d Floor	0			0	0.00	*		0	0.00 *			0	0.00
Infilt	ration	0			0		*		0	0.00 *	-58,1	197	-58,197	65.17
Sub To	tal==>	23,164	520		23,684	84.76	*			84.63 *		318	-86,957	97.38
Internal	Loads						*			*				
Lights		2,374	0		2,374	8.50	*	2,	374	8.67 *		0	0	0.00
People		1,885			1,885	6.75	*		933	3.41 *	1	0	0	0.00
Misc		0	0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sub To	tal==>	4,259		0	4,259	15.24	*	3,	307	12.08 *		0	0	0.00
Ceiling	Load	916	-916		0	0.00	*		900	3.29 *	-8	394	0	0.00
Outside (Air	0	0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sup. Fan	Heat				0	0.00	*			0.00 *			0	0.00
Ret. Fan	Heat		0		0	0.00	*			0.00 *			0	0.00
Duct Hea	t Pkup		0		0	0.00	*			0.00 *			0	0.00
OV/UNDR S	Sizing	0			0	0.00			0		-2,3	342	-2,342	2.62
Exhaust 1			0	0	0	0.00				0.00 *			0	0.00
Terminal	8ypass		0	0	0	0.00				0.00 *			0	0.00
Crand Tai	+-1>	28,339	70/	0	27 042	100.00	*	27	771	100 00 *	-89,0	157	-00 200	100.00
Grand ru	td1/	20,337	-396	. 0	21,742	100.00	Ŧ	21,	3/1	100.00	-07,0	130	-07,277	100.00
			C00I											
			Sens Cap. (Mbh)										11455 (5	1) (%)
ain Cla					-						Floor Part			
ux Clg	0.0	0.0	27.0 0.0	1,733			.0	0.0	0.0		ExFlr	0		
_	0.0		0.0	0			.0	0.0	0.0		Roof	-		0 0
otals			٧.٧	V	0.0	, v v	. 0	v.v	0.0	0.0	Wall	2,199		359 16
	HFATT	NG COTE SEL	ECTION		ΔΤΑ	FLOWS (c	fm)			ENGINEERING	CHECKS	TEMS	PERATURE	S (F)
		ty Coil A	irfl Ent	Lvg		Cooling	<i>,</i> Не	eating	C1	g % OA	0.0	Тур		
i	(Mbh	•			Vent	0	.,-	0		g Cfm/Sqft		SADB		0 121.8
ain Htg	-90	,	-		Infil	0.		836		g Cfm/Ton		Plenur		
ux Htg	0				Supply			1,520		g Sqft/Ton		Retur		
_	-0				Mincfm	0		0		g Btuh/Sqft		Ret/O		
	0		0.0		Return	1,933		1,520		. People		Runari		
umidif	0		0 0.0		Exhaust	0		0		g % OA		Fn Mt		
pt Vent	0		0.0		Rm Exh	0		0		g Cfm/SqFt		Fn Blo		
otal	-90				Auxil						-52.39	Fn Fr		1 0.1

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

------ BUILDING U-VALUES-----

						Roo (Btu	m U-Val /hr/sqf					Room Mass	Room Capac.
Room					Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Desc	ription	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST F	LOOR	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.154	0.578	51.4	10.97
2	2ND F	LOOR	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.060	0.000	22.0	8.05
Ione	1	Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.108	0.578	36.7	9.51
System	1	Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.108	0.578	36.7	9.51
Buildin	g		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.108	0.578	36.7	9.51

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

Room Number	Description		er of icate	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FLOOR	i	1	864	864	0	0	0	0	0	136	13	93 5
2	2ND FLOOR	1	1	864	864	0	0	0	0	864	223	20	905
Zone	1 Total/Ave				1,728	0	0	0	0	864	359	16	1,840
System	1 Total/Ave				1,728	0	0	0	0	864	359	16	1,840
Buildin	g				1,728	0	0	0	0	864	359	16	1.840

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.180 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.145 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVW) = 16.91 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

System Totals

Percent	Cool	ling Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	0	0	-4,527	5	222	96.7	0	0	0.0	0	0
5 - 10	0.2	0	0	-9,053	7	309	193.3	0	0	0.0	0	0
10 - 15	0.3	0	0	-13,580	. 5	238	290.0	0	0	0.0	0	0
15 - 20	0.5	0	0	-18,107	11	527	386.7	42	2,120	0.0	0	0
20 - 25	0.6	0	0	-22,633	40	1,874	483.3	0	0	0.0	0	0
25 - 30	0.7	0	0	-27,160	5	257	580.0	0	0	0.0	0	0
30 - 35	0.8	0	0	-31,687	6	271	676.7	0	0	0.0	0	0
35 ~ 40	0.9	0	0	-36,213	4	212	773.3	20	1,043	0.0	0	0
40 - 45	1.0	0	0	-40,740	3	142	870.0	0	0	0.0	0	0
45 - 50	1.2	0	0	-45,267	1	59	966.6	0	17	0.0	0	0
50 - 55	1.3	0	0	-49,793	8	362	1,063.3	0	0	0.0	0	0
55 - 60	1.4	0	0	-54,320	0	22	1,160.0	0	0	0.0	0	0
60 - 65	1.5	0	0	-58,847	2	71	1,256.6	0	0	0.0	0	0
65 - 70	1.6	0	0	-63,373	0	0	1,353.3	0	0	0.0	0	0
70 - 75	1.7	. 0	0	-67,900	0	19	1,450.0	0	0	0.0	0	0
75 - 80	1.9	0	0	-72,427	0	9	1,546.6	32	1,631	0.0	0	0
80 - 85	2.0	0	0	-76,953	0	0	1,643.3	0	0	0.0	0	0
85 - 90	2.1	0	0	-81,480	0	0	1,740.0	0	0	0.0	0	0
90 - 95	2.2	0	0	-86,007	0	0	1,836.6	0	0	0.0	0	0
95 - 100	2.3	0	0	-90,533	3	118	1,933.3	5	277	0.0	0	0
Hours Off	0.0	0	8,760	. 0	0	4,048	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

		В	UILDING	TEMPER	ATURE	PROFI	L E S		
Temperature					Zone Number				
Range (F)	1								
Max. Temp.	102.9								
Mo./Hr.	7 22								
Day Type	1								
				Ni	umber of Hou	ırs			
Above 100	312								
95 - 100	1,198								
90 - 95	1,097								
85 - 90	507								
80 - 85	558								
75 - 80	0								
70 - 75	0								
65 - 70	4,446								
60 - 65	642								
55 - 60	0								
50 - 55	0								
Below 50	0								
Min. Temp.	60.2								
Mo./Hr.	2 15							•	
Day Type	2								

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	GAS On Peak (Therm)	GAS DMND On Peak (Thrm/hr)
Jan	1,710	3	306	1
Feb	1,545	3	300	1
March	1,716	3	207	1
April	1,415	3	97	0
May	231	1	0	0
June	226	1	0	. 0
July	226	1	0	0
Aug	234	1	0	0
Sept	220	1	0	0
0ct	1,080	3	66	0
Nov	1,654	3	143	0
Dec	1,708	3	258	1
Total	11,967	3	1,378	1

Building Energy Consumption = 103,364 (Btu/Sq Ft/Year) Source Energy Consumption = 154,839 (Btu/Sq Ft/Year)

Floor Area = 1,728 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

Ret Num	Equip Code	Jan	Feb	Mar	Apr	Moni May	June	umption July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS													
	ELEC	229	207	234	220	231	226	226	234	220	231	220	226	2,705
	PK	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
1	MISC LD	•		-										
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3										_				
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD		•											
	P STEAM	0	0	0.0	0.0	0	0	0 0.0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD P HOTH20	0	0	0	0	0	٥	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD				•									
•	P CHILL	0	0	0	0 .	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1000		PREV	ENTS COO	LING ENE	RGY								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5001		CHIL	LED WATE	R PUMP C	. V .								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	ЬK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5010		COND		TER PUMP									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2454				FURNACE									
	GAS	306	300	207	97	0	0	0	0	0	66	143	258	1,378
	PK	1.1	1.1	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.4	1.1	. 1.1
	EQ5254				FURNACE I									
	ELEC	1482	1338	1482	1195	0	0	0	0	0	848	1434	1482	9,262
	PK	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1

BASE BUILDING

Grand Total

2.9 100.00

UIILIY	PEAK CHEC	KSUMS
Utility ELECTRIC DEMAND		
Peak Value 2.9 (kW) Yearly Time of Peak 6 (hr) 1 (mo)		
Hour 6 Month 1		
Sub Total	0.0	0.00
Heating Equipment		
1 EQ2454 RESIDENT GAS FURNACE W-FAN	2.0	69.75
Sub Total	2.0	69.75
Sub Total	0.0	0.00
Sub Total	0.0	0.00
Miscellaneous		
Lights Base Utilities Misc Equipment Sub Total		30.25 0.00 0.00 30.25

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                           **
       TRACE 600
               ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 201

CARLISLE Weather File Code:

ENERGY SAVINGS OPPORTUNITY STUDY Location:

Latitude: 40.2 (deg) Longitude: 77.2 (deg) 5 Time Zone: Elevation: 475 (ft)

29.2 (in. Hg) Barometric Pressure:

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 92 (F) Summer Design Dry Bulb: Summer Design Wet Bulb: 72 (F) 4 (F) Winter Design Dry Bulb: Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20

0.0742 (Lbm/cuft) Air Density: Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) 4.790.2 (Btu-min./hr/cuft) Latent Heat Factor: 4.4519 (Lb-min./hr/cuft) Enthalpy Factor:

Design Simulation Period: May To September System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

13: 3:28 1/12/94 Time/Date Program was Run: C8201 .TM

Dataset Name:

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

------ SYSTEM SUMMARY -------(Design Airflow Quantities)

System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1 82	0	1,715	1,520	2,441	726	0	0
Totals	0	1,715	1,520	2,441	726	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

------ SYSTEM SUMMARY -----(Design Capacity Quantities)

(Design Capacity Quantities)

System Number	System Type	Main Sys.		Opt. Vent		Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)		Opt. Vent	Heating Totals (Btuh)
1 S Totals	SZ	2.1	0.0	0.0	2.1	-78,543 -78,543	0	0	0	0	0	-78,543 -78,543

The building peaked at hour 17 month 7 with a capacity of 2.1 tons

------ ENGINEERING CHECKS-------ENGINEERING

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

. ----- Cooling ---- Heating ----Percent System Outside Cfm/ Sq Ft Cfm/ Btuh/ Floor Area System Main/ Cfm/ Btuh/ Number Auxiliary Sq Ft /Ton Sq Ft Sq Ft Sa Ft Sq Ft Type Air Ton 0.99 802.7 808.7 14.84 0.88 -45.45 1,728 1 Main SZ 0.00

System 1 Peak SZ - SINGLE ZONE

	******** t Time ==		OOLING COIL Mo/Hr:		********		**** *	** CLG SP Mo/Hr				TING COIL P Mo/Hr: 13		******
			DB/WB/HR:		0		*	OAD8				OADB:	-	
		_					*			*				
		Space		Ret. Air		Percnt Of Tot		Spac Sensibl		Percht *	•			Percnt
Paus lana		Sens.+Lat.	Sensible					Sensibi (Btuh		Of Tot *	-			Of Tot
Envelope		(Btuh)	(Btuh)		. (8tuh)	(%) 0.00		•	1	(%) * 0.00 *		11) (BL	-	(\$) 0.00
-		0	0		0	0.00			0	0.00 *		0	0	0.00
-	e Cond	-	0		•			1,65	-	6.63 *		76 - 1,	-	1.90
Roof C		1,651	0		1,651					42.15 *			4/0	0.00
Glass		10,506	0		10,506			10,50		10.53 *			-	16.64
Glass		2,626			2,626			2,62						
Wall C		3,464	180		3,644	14.21		3,46	_	13.90 *		20 -6,	_	8.80
Partit		0			0	0.00			0	0.00 *		0	0	0.00
-	d Floor	0			0	0.00			0	0.00 *		0	0	0.00
	ration	0	400		0	0.00			0	0.00 *		44 -50,		64.97
	tal==>	18,247	180		18,427	71.87		18,24	1	73.21 *	-	84 -71,	808	92.30
Internal							*		_	*				
Lights		2,418	0		2,418	9.43		2,41		9.70 *		0	0	0.00
People		1,919			1,919	7.49		96		3.88 *		0	0	0.00
Misc		0	0			0.00			-	0.00 *		0	0	0.00
	tal==>	4,337	0	0	4,337	16.92		3,38		13.58 *		0	0	0.00
Ceiling		379	-379		0	0.00		41		1.67 *			0	0.00
O utside		0	0	0	0	0.00			0	0.00 *		0	0	0.00
Sup. Fan					0	0.00				0.00 *			0	0.00
Ret. Fan			0		0	0.00				0.00 *			0	0.00
Duct Hea			0		0	0.00				0.00 *			0	0.00
OV/UNDR		2,876			2,876	11.22		2,87	6	11.54 *	•	93 -5,	993	7.70
Exhaust			0	-	0	0.00				0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00				0.00 *			0	0.00
							*			*				
Grand To	tal==>	25,840	-200	. 0	25,640	100.00	*	24,92	6	100.00 *	-77,8	16 -77,	801	100.00
					ELECTION							AREAS		
;					Enterin								s (st	') (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)				_	-	Grains		•		
Main Clg	2.1	25.6	24.7	1,715	75.3 62	.6 66.	5	61.5 5	7.6	66.6	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	.0 0.		0.0	0.0	0.0		0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0	0.0	0.0	0.0	Roof	864		0 0
Totals	2.1	25.6									Wall	2,199	3	59 16
	HEATIN	G COIL SELI	ECTION		AIR	FLOWS (cf	m)		EN	GINEERING	CHECKS	TEMPERA	TURES	(F)
		y Coil A		Lvg		Cooling		ating			0.0	Type		Htg
į		(cfr			Vent	0					0.99	SADB		115.0
Main Htg	-78.			115.0	Vent Infil	0		726		Cfm/Ton		Plenum	75.8	
Aux Htg	0.	0		0.0	Supply	1.715		1.520	-	Sqft/Ton		Return	75.3	
Preheat	-0.	0 1,	715 67.6	61.5	Mincfm	0		0	_	Btuh/Sqft		Ret/OA	75.3	
Reheat	0.		0 0.0	0.0		1,715					5	Runarnd	75.0	
Humidif	0.		0 0.0	0.0		0		0			0.0	Fn MtrTD	0.0	
Opt Vent	0.		0 0.0	0.0	Rm Exh	ō		Ó	Hta	Cfm/SaFt	0.88	Fn BldTD	0.0	
Total	-78.			***	Auxil	Ö		Ŏ			-45.45	Fn Frict	0.1	
. 5041	70.	•				v		•	9		70170			

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

			Room U-Values (Btu/hr/sqft/F)									Room Mass	Room Capac.	
Room					Summr	Wintr		Summr	Wintr			(lb/	(Btu/	
Number	Desc	ription	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)	
1	1ST F	LOOR	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.056	0.578	52.8	11.26	
2	2ND F	LOOR	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.060	0.000	23.0	8.25	
Zone	1	Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.578	37.9	9.75	
System	1	Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.578	37.9	9.75	
Buildin	g		0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.578	37.9	9.75	

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

BUILDING AREAS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FLOOR	1	1	864	864	0	0	0	0	0	136	13	935
2	2ND FLOOR	1	1	864	864	0	0	0	0	864	223	20	905
Zone	1 Total/Ave.				1,728	0	0	0	0	864	359	16	1,840
System	1 Total/Ave.				1,728	0	0	0	0	864	359	16	1,840
Buildin	g				1,728	0	Ö	0	0	864	359	16	1,840

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

------ A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.139 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.107 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 15.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)		Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	0	0	-3,927	6	259	85.8	0	0	0.0	0	Ō
5 - 10	0.2	0	0	-7,854	6	285	171.5	0	0	0.0	0	0
10 - 15	0.3	0	0	-11,781	7	319	257.3	0	0	0.0	0	0
15 - 20	0.4	0	0	-15,709	11	509	343.0	42	2,120	0.0	0	0
20 - 25	0.5	0	0	-19,636	39	1,785	428.8	0	0	0.0	0	0
25 - 30	0.6	. 0	0	-23,563	6	266	514.6	0	0	0.0	0	0
30 - 35	0.7	0	0	-27,490	7	317	600.3	0	0	0.0	0	0
35 - :40	0.9	0	0	-31,417	4	195	686.1	0	0	0.0	0	0
40 - 45	1.0	0	0	-35,344	1	31	771.8	20	1,009	0.0	0	Ō
45 - 50	1.1	0	0	-39,272	3	155	857.6	1	51	0.0	0	0
50 - 55	1.2	0	0	-43,199	8	359	943.4	0	0	0.0	0	0
55 - 60	1.3	0	0	-47,126	0	0	1,029.1	0	0	0.0	0	0
60 - 65	1.4	. 0	0	-51,053	0	19	1,114.9	0	0	0.0	0	0
65 - 70	1.5	0	0	-54,980	0	9	1,200.6	0	0	0.0	0	0
70 - 75	1.6	0	0	-58,907	0	0	1,286.4	0	0	0.0	. 0	0
75 - 80	1.7	0	0	-62,834	0	0	1,372.2	0	0	0.0	0	0
80 - 85	1.8	0	0	-66,762	0	0	1,457.9	0	0	0.0	0	0
85 - 90	1.9	0	0	-70,689	0	11	1,543.7	31	1,591	0.0	0	0
90 - 95	2.0	0	0	-74,616	1	48	1,629.4	0	0	0.0	0	0
95 - 100	2.1	0	0	-78,543	1	59	1,715.2	6	317	0.0	0	0
Hours Off	0.0	0	8,760	. 0	. 0	4,134	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

		BUILDING TEMPERATURE PROFILES
Temperature		Zone Number
Range	1	
(F)		
Max. Temp.	105.2	
Mo./Hr.	8 21	
Day Type	1	
		Number of Hours
Above 100	1,153	
95 - 100	1,181	
90 - 95	485	
85 - 90	380	
80 - 85	473	
75 80	0	
70 - 75	17	
65 - 70	4,635	
60 - 65	436	
55 - 60	0	
50 - 55	0	
Below 50	0	
Min. Temp.	61.8	
Mo./Hr.	2 15	
Day Type	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2

WALL & ROOF INSULATION

	ELEC	DEMAND.	GAS	GAS DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	1,514	3	253	1
Feb	1,368	3	250	1
March	1,520	3	171	0
April	1,240	3	7 7	0
May	231	1	0	0
June	226	1	0	0
July	226	1	0	0
Aug	234	1	0	0
Sept	220	1	. 0	0
Oct	871	3	44	0
Nov	1,464	3	115	0
Dec	1,511	3	211	1
Total	10,626	3	1,120	1

Building Energy Consumption = 85,784 (Btu/Sq Ft/Year) Source Energy Consumption = 131,176 (Btu/Sq Ft/Year)

Floor Area = 1,728 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION---------

ef	Equip -					Mont	hly Cons	umption ·						
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Tota
0	LIGHTS												22/	
	ELEC	229	207	234	220	231	226	226	234	220	231	220	226	2,70
	PK	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2	MISC LD												•	
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0 .	^
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
5	MISC LD												•	
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	۸
	PK	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD										•	•		
	P CHILL	0	0	0 .	. 0	0	0	0.0	0	0.0	0.0	0	0.0	0.
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ1000			ENTS COO									•	
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	٨
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ5001			LED WATE										
	ELEC	0	0	0	0		0	0	0	0	0	0	0	4
	PK	0.0	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	E05010			ENSER WA										
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	_
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ2454			DENT GAS										
	GAS	253	250	171	77	0	0	0	0	0	44	115	211	1,12
	PK	0.9	0.9	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.9	0.
1	EQ5254			DENTIAL										
	ELEC	1286	1161	1286	1019	0	0	0	0	0	639	1244	1286	7,92
	PΚ	1.7	1.7	1.7	1.7	0.0	0.0	0.0	0.0	0.0	1.7	1.7	1.7	1.

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

	UTILITY	PEAK	CHECKSUMS	
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UTILITY PEAK	CHEC	KSUMS
Utility ELECTRIC DEMAND		
Peak Value 2.6 (kW) Yearly Time of Peak 6 (hr) 1 (mo)		
Hour 6 Month 1		
Sub Total	0.0	0.00
Heating Equipment		
1 EQ2454 RESIDENT GAS FURNACE W-FAN	1.7	66.67
Sub Total .	1.7	66.67
Sub Total	0.0	0.00
Sub Total	0.0	0.00
Miscellaneous		
Lights	0.9	
Base Utilities		0.00
Misc Equipment		0.00
Sub Total	0.9	33.33
Grand Total	2.6	100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 201

Time/Date Program was Run:

Dataset Name:

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) . Time Zone: 5 475 (ft) Elevation: 29.2 (in. Hg) Barometric Pressure: 1.00 Summer Clearness Number: Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) 72 (F) Summer Design Wet Bulb: Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 | Air Density: 0:0742 (Lbm/cuft) 0.2444 (8tu/lbm/F) Air Specific Heat: 1.0882 (Btu-min./hr/cuft/F) Density-Specific Heat Prod: 4,790.2 (Btu-min./hr/cuft) Latent Heat Factor: Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

13: 6:23 1/12/94

CB201 .TM

AIRFLOW - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

------ SYSTEM SUMMARY ------ (Design Airflow Quantities)

					Auxil.	Room		
System Sy Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	1,933	1,520	2,593	660	0	0
Totals		0	1.933	1,520	2,593	660	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

------ Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (8tuh) 0 -77,964 1 SZ 2.3 0.0 0.0 2.3 -77,964 0 0 -77,964 0 0 0 -77,964Totals 2.3 0.0 0.0 2.3 0

The building peaked at hour 17 month 7 with a capacity of 2.3 tons

ENGINEERING CHECKS - ALTERNATIVE 3 WEATHÉRSTRIP & CAULKING

Percent ----- Cooling ---- Heating ---Outside Cfm/ System Main/ Cfm/ Sq Ft Btuh/ Cfm/ Btuh/ Floor Area System Sq Ft Air Sa Ft Sq Ft /Ton Number Auxiliary Type Ton Sq Ft Sq Ft

1 Main SZ 0.00 1.12 830.3 742.1 16.17 0.88 -45.12 1,728

System 1 Peak SI - SINGLE ZONE

Peaked a	t Time ==:	>	OOLING COIL Mo/Hr: 7 DB/WB/HR: 8	7/17			* Mo	S SPACE D/Hr: DADB:	7/17 *		ING COIL A Mo/Hr: 13 OAD8:	3/ 1	******
		Space		Ret. Air	Net	Percnt		Space	Percnt *	•		eak	Percnt
	Se	ens.+Lat.	Sensible	Latent	Total			sible	Of Tot *			ens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		ituh)	(%) *		ı) (8t	uh)	(%)
Skylit	e Solr	0	0		0	0.00		0	0.00 *		0	0	0.00
Skylit	e Cond	0	0		0	0.00		0	0.00 *		0	0	0.00
Roof C	ond	3,865	0		3,865	13.83		,865				167	4.13
Glass		10,729	0		10,729	38.40		,729	39.20 *			0	0.00
Glass		2,699	0		2,699	9.66		2,699	9.86 *				16.87
Wall C		5,871	520		6,390	22.87		,871	21.45 *				16.49
Partit		0			0	0.00		0	0.00 *		•	0	0.00
	d Floor	0			0	0.00		0	0.00 *		-	0	0.00
Infilt		0			0	0.00		0	0.00 *			945	
Sub To		23,164	520		23,684	84.76		,164		-	6 -74	/05	97.36
Internal		0.774	^		A 77/		*	27/	*		۸	^	^ ^^
Lights		2,374	0		2,374	8.50		2,374	8.67 *		0	0	0.00
People		1,885	0	^	1,885	6.75		933	3.41 *		0	0	0.00
Misc	4.1	4 250	0	0	4 250	0.00		0	0.00 *		0	0	0.00 0.00
	tal==>	4,259 916	-014	U	4,259	15.24 0.00		900 900	12.08 * 3.29 *		•	0	0.00
Ceiling Outside		0	-916 0	0	0	0.00		0	0.00 *		0	0	0.00
Sup. Fan		V	U	U	0	0.00		V	0.00 *		V	0	0.00
Ret. Fan			0		0	0.00			0.00 *			۸	0.00
Duct Hea			0		. 0	0.00			0.00 *		•	0	0.00
OV/UNDR		0	V		0	0.00		0	0.00 *		4 -2	024	2.64
Exhaust		v	0	0	0	0.00		٠	0.00 *	,		0	0.00
Terminal			0	0	0	0.00			0.00 *			0	0.00
101111111111111111111111111111111111111	0) 100						*		*			-	
Grand To	tal==>	28,339	-396	. 0	27,942	100.00	* 27	,371	100.00 *	-76,48	4 -76,	730	100.00
			cool	THE COIL SE	ELECTION						AREAS		
	Total (Capacity	Sens Cap.	Coil Airfl				ving D	B/WB/HR	Gross Tota	l Glas	s (sf) (%)
1	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg		-		Grains	Floor	1,728		
Main Clg	2.3	27.9	27.0	1,933 .	75.7 62			57.9		Part	0		
Aux Clg	0.0	0.0	0.0	0		.0 0.		0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	864		0 0
Totals	2.3	27.9								Wall	2,199	3	59 16
	HEATING	COIL SEL	ECTION		AIR				ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacity	Coil A	irfl Ent			Cooling	Heating		g % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfi	m) Deg F	-	Vent	0	0		g Cfm/Sqft	1.12	SADB	62.0	
Main Htg	-78.0				Infil	0	660		g Cfm/Ton	830.27	Plenum	76.8	
Aux Htg	0.0		0.0	0.0	Supply	1,933	1,520		g Sqft/Ton	742.10	Return	75.7	
Preheat	-0.0		933 67.1	61.9	Mincfm	0	0		g Btuh/Sqft	16.17	Ret/OA	75.7	
Reheat	0.0		0.0	0.0	Return	1,933	1,520		. People	5	Runarnd	75.0	
Humidif	0.0		0.0	0.0	Exhaust	0	0		g % OA	0.0	Fn MtrID	0.0	
Opt Vent	0.0		0.0	0.0	Rm Exh	0	0	-	g Cfm/SqFt	0.88	Fn BldTD	0.0	
Total	-78.0)			Auxil	0	0	Htq	g Btuh/SqFt	-45.12	Fn Frict	0.1	0.1

BUILDING U-VALUES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

			Room U-Values (8tu/hr/sqft/F)										Room Capac.
Room					Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Desc	ription	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST F	LOOR	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.154	0.578	51.4	10.97
2	2ND F	LOOR	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.060	0.000	22.0	8.05
Zone	1	Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.108	0.578	36.7	9.51
System	1	Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.108	0.578	36.7	9.51
Buildin	g		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.108	0.578	36.7	9.51

BUILDING AREAS - ALTERNATIVE 3 . WEATHERSTRIP & CAULKING

BUILDING AREAS

Room Number	Description	Number of Duplicate Flr Rm	, ,	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FLOOR	1 1	864	864	0	0	0	0	0	136	13	935
2	2ND FLOOR	1 1	864	864	0	0	0	0	864	223	20	905
Zone	1 Total/Ave.			1,728	0	0	0	0	864	359	16	1,840
System	1 Total/Ave.		•	1,728	0	0	0	0	864	359	16	1,840
Buildin	g			1,728	0	0	0	0	864	359	16	1,840

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.180 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.145 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 16.91 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)		Hours	Capacity (8tuh)		Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	1.0	0	0	-3,898	5	217	96.7	0	0	0.0	0	0
5 - 10	0.2	0	0	-7,796	5	221	193.3	0	0	0.0	0	0
10 - 15	0.3	0	0	-11,695	6	281	290.0	0	0	0.0	0	0
15 - 20	0.5	0	0	-15,593	9	422	386.7	42	2,120	0.0	0	0
20 - 25	0.6	0	0	-19,491	41	1,857	483.3	0	0	0.0	0	0
25 - 30	0.7	0	0	-23,389	6	272	580.0	0	0	0.0	0	0
30 - 35	0.8	0	0	-27,287	6	292	676.7	0	0	0.0	0	0
35 - 40	0.9	0	0	-31,185	4	159	773.3	19	971	0.0	0	0
40 - 45	1.0	0	0	-35,084	4	167	870.0	0	0	0.0	0	0
45 - 50	1.2	0	0	-38,982	1	48	966.6	2	89	0.0	0	0
50 - 55	1.3	0	0	-42,880	9	385	1,063.3	0	0	0.0	0	0
55 - 60	1.4	0	0	-46,778	1	24	1,160.0	0	0	0.0	0	0
60 - 65	1.5	0	0	-50,676	1	38	1,256.6	0	0	0.0	0	0
65 - 70	1.6	0	0	-54,575	0	0	1,353.3	0	0	0.0	0	0
70 - 75	1.7	0	0	-58,473	0	19	1,450.0	0	0	0.0	. 0	0
75 - 80	1.9	0	0	-62,371	0	9	1,546.6	30	1,541	0.0	0	0
80 - 85	2.0	0	0	-66,269	0	0	1,643.3	0	0	0.0	0	0
85 - 90	2.1	0	0	-70,167	0	0	1,740.0	0	0	0.0	0	0
90 - 195	2.2	0	0	-74,066	0	0	1,836.6	0	0	0.0	0	0
95 - 100	2.3	0	0	-77,964	3	118	1,933.3	7	367	0.0	0	0
Hours Off	0.0	0	8,760	0	0	4,231	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

Temperature		Zone Number
Range (F)	1	
Max. Temp.	102.9	
Mo./Hr.	7 22	
Day Type	1	
Above 100	312	·
95 - 100	1,198	
90 - 95	1,097	
85 - 90	507	
80 - 85	558	
75 - 80	0	
70 - 75	17	
65 - 70	4,534	
60 - 65	537	
55 - 60	0	
50 - 55	0	
Below 50	0	
Min. Temp.	61.4	
Mo./Hr.	2 15	
Day Type	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	GAS On'Peak (Therm)	GAS DMND On Peak (Thrm/hr)
Jan	1,505	3	262	1
Feb	1,359	3	256	1
March	1,510	3	173	1
April	1,085	3	72	0
May	231	1	0	0
June	226	1	0	0
July	226	1	0	0
Aug	234	1	0	0
Sept	220	1	0	0
Oct	851	3	47	0
Nov	1,455	3	120	0
Dec	1,502	3	222	1
Total	10,405	3	1,152	1

Building Energy Consumption = 87,207 (Btu/Sq Ft/Year) Source Energy Consumption = 131,822 (Btu/Sq Ft/Year)

Floor Area = 1,728 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	Equip -					Mont	hly Cons	umption ·						
lum	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota
0	LIGHTS													
	ELEC	229	207	234	220	231	226	226	234	220	231	220	226	2,70
	PK	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
5	MISC LD	۸	^		^	0		^	^	^	٥	•	٨	
	P HOTH20 PK	0.0	0 0. 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.
	1	•••	0.0	0.0		0.0	•••	***	0.0	0.0	0,0	0.0	0.0	٠.
	MISC LD P CHILL	0	0	0	0 -	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ1000		PREV	ENTS COO	LING ENE	RGY								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
i	EQ5001		CHIL	LED WATE	R PUMP C.	.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
i	EQ5010		COND		TER PUMP	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
	EQ2454				FURNACE									
	GAS	262	256	173	72	0	0	0	0	0	47	120	222	1,15
	PK	0.9	0.9	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.9	. 0.
	EQ5254				FURNACE (AN								
	ELEC	1276	1153	1276	864	0	0	0	0	0	619	1235	1276	7,70
	PK	1.7	1.7	1.7	1.7	0.0	0.0	0.0	0.0	0.0	1.7	1.7	1.7	1.

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

	-UTILITY	PEAK	CHECKSUMS	
Utility ELECTRIC DEMAND				
Peak Value 2.6 (kW) Yearly Time of Peak 6 (hr) 1 (mo)				

0.0

0.0

0.00

0.9 33.50

2.6 100.00

Hour 6 Month 1

Base Utilities

Misc Equipment

Sub Total

Grand Total

Sub Total	1		0.0
eating E	Equipment		
i	EQ2454	RESIDENT GAS FURNACE W-FAN	1.7
Sub Total	1		1.7
Sub Total	1		0.0
Sub Total	l		0.0
Miscellar	neous		
Lights			0.9

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**
      TRACE
          600
             ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 201

Weather File Code: CARLISLE **ENERGY SAVINGS OPPORTUNITY STUDY** Location: 40.2 (deg) Latitude: Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) 72 (F) Summer Design Wet Bulb: Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 0.20 Winter Ground Relectance: Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F) Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September

System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

Time/Date Program was Run: 13: 9:15 1/12/94 Dataset Name: CB201 .TM

AIRFLOW - ALTERNATIVE 4 COMPINED ECOS

			Main	Auxil.	Room		
System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return - Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 SZ	0	1,715	1,520	2,331	616	0	0
Totals	0	1,715	1,520	2,331	616	0	0

CAPACITY - ALTERNATIVE 4
COMPINED ECOS

------ Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals (8tuh) (8tuh) (8tuh) (8tuh) (Btuh) (Tons) (Btuh) (Btuh) Number Type (Tons) (Tons) (Tons) -70,687 -70,687 0 2.1 0.0 0.0 2.1 1 SZ 0 -70,687 0 0.0 2.1 -70,687 0 Totals 2.1 0.0

The building peaked at hour 17 month 7 with a capacity of 2.1 tons

ENGINEERING CHECKS - ALTERNATIVE 4 COMPINED ECOS

------ ENGINEERING CHECKS------ENGINEERING Percent ----- Cooling ---- Heating ---Cfm/ Btuh/ Floor Area System Main/ System Outside Cfm/ Cfm/ Sq Ft Btuh/ Sq Ft Type Air Sq Ft /Ton Sq Ft Sq Ft Sq Ft Number Auxiliary Ton -40.91 1,728 0.00 0.99 802.7 808.7 14.84 0.88 1 Main SZ

System 1 Peak SZ - SINGLE ZONE

Peaked at Time		Mo/Hr:	•			* Mo/		•		Mo/Hr: 13	-	
Outside Air ==:) OA	ADB/WB/HR:	89/ 72/ 91.	0	:	* 04 *	ADB:	89 *		OAD8:	4	
	Space	Ret. Air	Ret. Air	Net	Percnt	≰ Sp	ace	Percnt *	Space Pe	ak Coil F	eak	Percn
	Sens.+Lat.	Sensible	Latent	Total	Of Tot			Of Tot *	Space Se	ns Tot S	ens	Of To
Envelope Loads	(Btuh)	(Btuh)	(Btuh)	. (Btuh)	(%)	k (Bt	:uh)	(%) *	(Btu	h) (Bt	uh)	(\$
Skylite Solr	0	0		0	0.00	k	0	0.00 *		0	0	0.00
Skylite Cond		0		0	****		0	0.00 *		0	0	0.0
Roof Cond	1,651	0		1,651	6.44	ķ i,	651	6.63 *	-1,4	76 -1,	476	2.1
Glass Solar	10,506	0		10,506	40.98	10,	506	42.15 *		0	0	0.0
Glass Cond	2,626	0		2,626	10.24	2,	626	10.53 *				18.5
Wall Cond	3,464	1,80		- 3,643	14.21	3,	464	13.90 *	-6,4	19 -6,	843	9.7
Partition	0			0	0.00	K	0	0.00 *		0	0	0.00
Exposed Floor	. 0			0	0.00	ķ .	0	0.00 *		0	0	0.0
Infiltration	0			0	0.00	t	0	0.00 *	-42,8	82 -42,	882	61.3
Sub Total==>	18,247	180		18,427	71.87	18,	247	73.20 *	-63,7	21 -64,	145	91.7
Internal Loads					2	k		*				
Lights	2,418	0		2,418	9.43	2,	418	9.70 *		0	0	0.0
People	1,919			1,919	7.49	t	968	3.88 *		0	0	0.0
Misc	0	0	0	0	0.00	ŧ	0	0.00 *		0	0	0.0
Sub Total==>	4,337	0	0	4,337	16.92	3,	386	13.58 *		0	0	0.0
Ceiling Load	379	-379		0	0.00		417	1.67 *	-4;	39	0	0.0
Outside Air	0	0	0	0	0.00	•	0	0.00 *		0	0	0.0
Sup. Fan Heat				0	0.00	t		0.00 *			0	0.0
Ret. Fan Heat		0		0	0.00	•		0.00 *			0	0.0
Duct Heat Pkup		0		0	0.00	•		0.00 *			0	0.0
OV/UNDR Sizing	2,876			2,876	11.22		876	11.54 *	-5,79	99 -5,	799	8.2
Exhaust Heat		0	0	0	0.00			0.00 *			0	0.0
Terminal Bypass		0	. 0	0	0.00			0.00 *			0	0.00
					4			*				
Grand Total==>	25,840	-200	. 0	25,640	100.00	24,	926	100.00 *	-69,96	50 -69,	944	100.00
	l Capacity				ng DB/WB/HA		ing DE	3/WB/HR	Gross Tota	al Glas	s (sf	(\$)
) (Mbh)		(cfm)			-		Grains	Floor	1,728		
		24.7	1,715					66.6	Part	0		
ux Clg 0.		0.0	0		0.0		0.0	0.0	ExFlr	0		
ot Vent 0.		0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	864		0 (
otals 2.	1 25.6								Wall	2,199	3	59 16
HEAT	ING COIL SEL	ECTION		AIR	RFLOWS (cfm)	{	ENGINEERING	CHECKS	TEMPERA	TURES	(F)
Capac	ity Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clg	% 0A	0.0	Type	Clg	Htg
(Mb	h) (cf	m) Deg F	Deg F	Vent	0	0	Clo	g Cfm/Sqft	0.99	SADB	61.6	110.3
	0.7 1,		110.3	Infil	0	616	Clg	g Cfm/Ton	802.73	Plenum	75.8	67.
	0.0	0.0	0.0	Supply	1,715	1,520	Clo	sqft/Ton	808.72	Return	75.3	67.6
	0.0 1,	715 67.6	61.5	Mincfm	0	0	Clg	Btuh/Sqft	14.84	Ret/OA	75.3	67.6
	0.0	0.0	0.0	Return	1,715	1,520	No.	People	5	Runarnd	75.0	68.0
midif	0.0	0.0	0.0	Exhaust	0	0		\$ 0A	0.0	Fn MtrTD	0.0	0.0
	0.0	0.0	0.0	Rm Exh	0	0		cfm/SqFt		Fn 81dTD	0.0	
otal7	0.7			Auxil	0	0		Btuh/SqFt		Fn Frict	0.1	

BUILDING U-VALUES - ALTERNATIVE 4
COMPINED ECOS

					Roo (Btu		ues t/F)				Room Mass	Room Capac.
Room Number	Description	Part.	ExFlr		Wintr Skylt	Roof		Wintr Windo	Wall	Ceil.	(lb/ sqft)	(Btu/ sqft/F)
1	1ST FLOOR	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.056	0.578	52.8	11.26
2	2ND FLOOR	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.060	0.000	23.0	8.25
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.578	37.9	9.75
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.578	37.9	9.75
Buildin	g	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.578	37.9	9.75

BUILDING AREAS - ALTERNATIVE 4
COMPINED ECOS

------ BUILDING AREAS -----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FLOOR	1	1	864	864	0	0	0	0	0	136	13	935
2	2ND FLOOR	1	1	864	864	0	0	0	0	864	223	20	905
Zone	1 Total/Ave				1,728	0	0	0	0	864	359	16	1,840
System	1 Total/Ave			_	1,728	0	0	0	0	864	359	16	1,840
Buildin	g				1,728	0	0	0	. 0	864	359	16	1,840

ASHRAE 90 ANALYSIS - ALTERNATIVE 4 COMPINED ECOS

------ A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.139 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.107 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 15.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 COMBINED ECOS

. System Totals

Percent	Cool	ling Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflo	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	,
0 - 5	0.1	0	0	-3,534	5	220	85.8	0	0	0.0	0	0
5 - 10	0.2	0	0	-7,069	6	272	171.5	0	0	0.0	0	0
10 - 15	0.3	0	0	-10,603	7	314	257.3	0	0	0.0	0	0
15 - 20	0.4	0	0	-14,137	11	490	343.0	42	2,120	0.0	0	0
20 - 25	0.5	0	Û	-17,672	39	1,724	428.8	0	0	0.0	0	0
25 - 30	0.6	0	O	-21,206	7	299	514.6	0	0	0.0	0	0
30 - 35	0.7	9	0	-24,740	6	263	600.3	0	0	0.0	0	0
35 - 40	0.9	0	Ü	-28,275	5	203	686.1	0	0	0.0	0	0
40 - 45	1.0	O	0	-31,809	2	83	771.8	19	954	0.0	0	0
45 - 50	1.1	Û	0	-35,343	3	156	857.6	2	106	0.0	0	0
50 - 55	1.2	0	0	-38,878	7	298	943.4	0	0	0.0	0	0
55 - 60	1.3	0	0	-42,412	0	16	1,029.1	0	0	0.0	0	0
60 - 65	1.4	0	0	-45,947	0	12	1,114.9	0	0	0.0	0	0
65 - 70	1.5	. 0	0	-49,481	0	0	1,200.6	0	0	0.0	0	0
70 - 75	1.6	Ç.	0	-53,015	0	0	1,286.4	0	0	0.0	0	0
75 - 80	1.7	0	0	-56,550	0	0	1,372.2	0	0	0.0	0	0
80 - 85	1.8	0	0	-60,084	0	0	1,457.9	0	0	0.0	0	0
85 - 90	1.9	0	0	-63,618	1	39	1,543.7	29	1,497	0.0	0	0
90 - 95	2.0	0	0	-67,153	0	20	1,629.4	0	0	0.0	0	0
95 - 100	2.1	0	0	-70,687	i	59	1,715.2	8	411	0.0	0	0
Hours Off	0.0	0	8,760	. 0	0	4,292	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

Temperature Range	1	Zone Number
(F)		•
Max. Temp.	105.2	
Mo./Hr.	8 21	
Day Type	1	
		Number of Hours
Above 100	1,153	
95 - 100	1,181	
90 - 95	485	
85 - 90	380	
80 - 85	473	
75 - 80	9	
70 - 75	51	
65 - 70	4,742	
60 - 65	295	
55 - 60	Ĵ	
50 ~ 55	0	
Below 50	0	
Min Town	(0.7	
Min. Temp. Mo./Hr.	62.6 2 15	
Day Type	2 13	
vay type	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4

COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION

	ELEC	DEMAND	GAS	GAS DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	1,386	2	225	1
Feb	1,252	2	221	. 1
March	1,391	2	149	0
April	1,004	2	61	Ó
May	231	1	0	- 0
June	226	1	0	. 0
July	226	1	0	0
Aug	234	1	0	0
Sept	220	1	0	0
Oct	700	2	32	0
Nov	1,309	2	100	0
Dec	1,383	2	188	1
Total	9,562	2	976	1

Building Energy Consumption = 75,356 (Btu/Sq Ft/Year) 116,105 (8tu/Sq Ft/Year) Source Energy Consumption =

Floor Area =

1,728 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION -----

ef	Equip -					Mont		umption ·						
um	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													•
	ELEC	229	207	234	220	231	226	226	234	220	231	220	226	2,705
	PK	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
1	MISC LD	•												
	ELEC	0	0	0	0	. 0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	3	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0.0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTHEO	0	0	0	0	. 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD				•									
	P CHILL	0	0	0	0 ·	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1000			ENTS COO		RGY								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	. 0.0
1	EQ5001			LED WATE										
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5010		COND	ENSER WA	TER PUMP	C.V.								
	ELEC	0	0	0	0	0	0	0	Ō	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ2454		RESI	DENT GAS	FURNACE	W-FAN								
	GAS	225	221	149	61	0	0	0	0	0	32	100	188	976
	PK	0.8	0.8	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.8	0.8
1	EQ5254		RESI	DENTIAL	FURNACE I	FAN								
	ELEC	1157	1045	1157	784	0	0	0	0	0	468	1089	1157	6,856
	PK	1.6	1.6	1.6	1.6	0.0	0.0	0.0	0.0	0.0	1.6	1.6	1.6	1.6

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
COMBINED ECOS

Lights

Sub Total

Grand Total

Base Utilities Misc Equipment

T T I T T Y	PEAK CHECKSUMS
Utility ELECTRIC DEMAND	TERR OREOROUNG
Peak Value 2.4 (kW) Yearly Time of Peak 6 (hr) 1 (mo)	
Hour 6 Month 1	
Sub Total	0.0 0.00
Heating Equipment	
1 EQ2454 RESIDENT GAS FURNACE W-FAN	1.6 64.28
Sub Total	1.6 64.28
Sub Total	0.0 0.00
Sub Total	0.0 0.00
Miscellaneous	

0.9 35.72

0.9 35.72

2.4 100.00

0.00

0.00

0.0

0.0

Building 205 (Typical for 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, and 220)

Trace Input File

```
CONTENTS OF : E:\CB205.TM
LINE #
   1
       J0B - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 205
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
 10
       11///ZONE
  11
       LOAD - 1
 12
       19/1/BASE BUILDING
       20/1/1/1ST FLOOR/840/1/2/.8/.45/9//2
 13
 14
       20/2/1/2ND FLOOR/920/1/1/0//9//2
 15
       21/M///CBLQTX///CBLQTX
       22/2/1/YES////154
 16
 17
       24/1/1/27/5//156/0
 18
       24/1/2/22/7//156/90
 19
       24/1/3/5/8//157/270
       24/1/4/7.5/8//157/0
 20
 21
       24/1/5/6/8//157/90
 22
       24/1/6/30.5/8//157/180
       24/2/1/27.5/8//157/0
 23
 24
       24/2/2/24/8//157/90
 25
       24/2/3/35.5/8//157/180
 26
       25/1/1/2.75/1.3/8/.55/.57
 27
       25/1/5/38/1/1/.55/.57
 28
      25/1/6/69/1/1/.55/.57
 29
      25/2/1/3.75/1.3/8/.55/.57
 30
       25/2/2/2.8/2/4/.55/.57
      25/2/3/59/1/1/.55/.57
 31
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF
 32
 33
      27/M/440/SF-PERS/230/190/.5/WATT-SF/INCAND
 34
      29/M/////.41/CFM-SF
 35
      30/M///855/CFM
      31/1/1/50/3//158/SINE-FIT/80/50
 36
 37
      SYSTEM - 1
 38
      39/1/BASE BUILDING
 39
      40/1/SZ
      41/1/1/1
 40
      42/1//.2
 41
      45/1/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
 42
      EQUIPMENT - 1
 43
      59/1/CARLISLE///BASE BUILDING
 44
      60/1/1/BLKPLANT/1/1
 45
      62/1/EQ1000/1
 46
      65/1/1//1/1
 47
      67/1/EQ2454/2
 48
 49
      69/1
 50
      LOAD - 2
      19/2/WALL & ROOF INSULATION
 51
      20/1/1/1ST FLOOR/840/1/2/.8/.45/9//2
 52
 53
      20/2/1/2ND FLOOR/920/1/1/0//9//2
      21/M///CBLQTX///CBLQTX
 54
 55
      22/2/1/YES////191
      24/1/1/27/5//145/0
 56
 57
      24/1/2/22/7//145/90
 58
      24/1/3/5/8//157/270
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CONTENTS OF : E:\CB205.TM
LINE #
  59
       24/1/4/7.5/8//157/0
  60
       24/1/5/6/8//157/90
  61
       24/1/6/30.5/8//157/180
  62
       24/2/1/27.5/8//157/0
       24/2/2/24/8//157/90
  63
  64
       24/2/3/35.5/8//157/180
  65
       25/1/1/2.75/1.3/8/.55/.57
  66
       25/1/5/38/1/1/.55/.57
  67
       25/1/6/69/1/1/.55/.57
  68
       25/2/1/3.75/1.3/8/.55/.57
  69
       25/2/2/2.8/2/4/.55/.57
  70
       25/2/3/59/1/1/.55/.57
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF/OFF
  71
  72
       27/M/440/SF-PERS/230/190/.5/WATT-SF/INCAND
  73
       29/M//////.39/CFM-SF
  74
       30/M///855/CFM
  75
       31/1/1/50/3//158/SINE-FIT/80/50
  76
       SYSTEM - 2
  77
       39/2/WALL & ROOF INSULATION
 78
       40/1/SZ
       41/1/1/1
  79
       42/1//.2
 80
 81
       45/1/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
       EQUIPMENT - 2
 82
 83
       59/2/CARLISLE///WALL & ROOF INSULATION
 84
       60/1/1/BLKPLANT/1/1
 85
       62/1/EQ1000/1
 86
       65/1/1//1/1
 87
       67/1/EQ2454/2
 88
       69/1
 89
       LOAD - 3
 90
       19/3/WEATHERSTRIP & CAULKING
       20/1/1/1ST FLOOR/840/1/2/.8/.45/9//2
 91
 92
       20/2/1/2ND FLOOR/920/1/1/0//9//2
 93
       21/M///CBLQTX///CBLQTX
      22/2/1/YES////154
 94
 95
      24/1/1/27/5//156/0
      24/1/2/22/7//156/90
 96
 97
      24/1/3/5/8//157/270
      24/1/4/7.5/8//157/0
 98
      24/1/5/6/8//157/90
 99
100
      24/1/6/30.5/8//157/180
      24/2/1/27.5/8//157/0
101
102
      24/2/2/24/8//157/90
103
      24/2/3/35.5/8//157/180
104
      25/1/1/2.75/1.3/8/.55/.57
105
      25/1/5/38/1/1/.55/.57
106
      25/1/6/69/1/1/.55/.57
      25/2/1/3.75/1.3/8/.55/.57
107
108
      25/2/2/2.8/2/4/.55/.57
109
      25/2/3/59/1/1/.55/.57
110
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF/OFF
111
      27/M/440/SF-PERS/230/190/.5/WATT-SF/INCAND
112
      29/M//////.32/CFM-SF
113
      30/M///855/CFM
114
      31/1/1/50/3//158/SINE-FIT/80/50
115
      SYSTEM - 3
116
      39/3/WEATHERSTRIP & CAULKING
```

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CONTENTS OF : E:\CB205.TM
LINE #
 117
       40/1/SZ
 118
       41/1/1/1
 119
       42/1//.2
 120
       45/1/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
 121
       EQUIPMENT - 3
 122
       59/3/CARLISLE///WEATHERSTRIP & CAULKING
 123
       60/1/1/BLKPLANT/1/1
 124
       62/1/EQ1000/1
 125
       65/1/1//1/1
 126
       67/1/EQ2454/2
 127
       69/1
 128
       LOAD - 4
129
       19/4/COMBINED ECOS
130
       20/1/1/1ST FLOOR/840/1/2/.8/.45/9//2
       20/2/1/2ND FLOOR/920/1/1/0//9//2
131
132
       21/M///CBLQTX///CBLQTX
133
       22/2/1/YES////191
134
       24/1/1/27/5//145/0
135
       24/1/2/22/7//145/90
       24/1/3/5/8//157/270
136
137
       24/1/4/7.5/8//157/0
138
       24/1/5/6/8//157/90
       24/1/6/30.5/8//157/180
139
140
       24/2/1/27.5/8//157/0
141
       24/2/2/24/8//157/90
       24/2/3/35.5/8//157/180
142
143
       25/1/1/2.75/1.3/8/.55/.57
144
       25/1/5/38/1/1/.55/.57
145
       25/1/6/69/1/1/.55/.57
146
       25/2/1/3.75/1.3/8/.55/.57
147
       25/2/2/2.8/2/4/.55/.57
148
       25/2/3/59/1/1/.55/.57
149
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQHTG/CBLQHTG/OFF/OFF/OFF
       27/M/440/SF-PERS/230/190/.5/WATT-SF/INCAND
150
151
       29/M/////.29/CFM-SF
152
       30/M///855/CFM
       31/1/1/50/3//158/SINE-FIT/80/50
153
154
       SYSTEM - 4
155
      39/4/COMBINED ECOS
156
      40/1/SZ
157
       41/1/1/1
158
       42/1//.2
      45/1/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
159
      EQUIPMENT - 4
160
      59/4/CARLISLE///COMBINED ECOS
1.61
      60/1/1/BLKPLANT/1/1
162
163
      62/1/EQ1000/1
164
      65/1/1//1/1
165
      67/1/EQ2454/2
166
      69/1
```

Building 205 (Typical for 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, and 220)

Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 205

Weather File Code:	CARLIS	LE
Location:	ENERGY	SAVINGS OPPORTUNITY STUDY
Latitude:	40.2	(deg)
Longitude:	77.2	(deg)
Time Zone:	5	
Elevation:		(ft)
Barometric Pressure:	29.2	(in. Hg)
Summer Clearness Number:	1.00	
Winter Clearness Number:	1.00	
Summer Design Dry Bulb:	92	• •
Summer Design Wet Bulb:	72	* *
Winter Design Dry Bulb:	4	(F)
Summer Ground Relectance:	0.20	
Winter Ground Relectance:	0.20	
Air Density:		(Lbm/cuft)
Air Specific Heat:		(8tu/lbm/F)
Density-Specific Heat Prod:		(Btu-min./hr/cuft/F)
Latent Heat Factor:		(Btu-min./hr/cuft)
Enthalpy Factor:	4.4519	(Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:28:18 1/12/94
Dataset Name: CB205 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

------SYSTEM SUMMARY -------(Design Airflow Quantities)

		Main			Auxil.	Room
utside irflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
0	3,420	3,420	4,549	1,129 1,129	0	0
	irflow (Cfm)	irflow Airflow (Cfm) (Cfm)	utside Cooling Heating irflow Airflow Airflow (Cfm) (Cfm) (Cfm) 0 3,420 3,420	irflow Airflow Airflow Airflow (Cfm) (Cfm) (Cfm)	utside Cooling Heating Return Exhaust irflow Airflow Airflow Airflow (Cfm) (Cfm) (Cfm) (Cfm) 0 3,420 3,420 4,549 1,129	utside Cooling Heating Return Exhaust Supply irflow Airflow Airflow Airflow Airflow (Cfm) (Cfm) (Cfm) (Cfm) (Cfm) (Cfm) (Cfm)

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 0 0 0 4.1 0.0 0.0 4.1 -122,100 0 0 -122,100 1 52 0 -122,100 0.0 4.1 4.1 -122,100 0 0 Totals 0.0

The building peaked at hour 16 month 9 with a capacity of 4.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

1 Main SZ 0.00 0.97 836.2 860.6 13.94 0.97 -34.69 3,520

System 1 Peak SZ - SINGLE ZONE

	t Time ==			9/16 B3/ 64/ 63.0			^k Mo/ ^k OA	Hr: 9			Mo/Hr: 13/ 1 OAD8: 4	
Jutsiae A	Alr ==>	URI	J8/W8/NK: (53/ 54/ 53.0		:	r UH k	νο. ι	*		UNUO. 4	
•		Space	Ret. Air	Ret. Air	Net				Percnt *	Space Pea		
	S	ens.+Lat.	Sensible	Latent	Total				Of Tot *	Space Sen		
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	. (Btuh)	(%)	k (Bt	uh)	(%) *	(8tuh) (Btuh)	(%)
Skylite	e Solr	0	0		0	0.00		0	0.00 *		0 0	
Skylite	e Cond	0	0		0	0.00	k .	0	0.00 *			0.00
Roof Co	ond	8,241	0		8,241	16.79	8,	241			4 -6,744	
Glass S	Solar	18,374	0		18,374	37.44	18,	374				
Glass (Cond	2,704	0		2,704	5.51	2,	704	5.50 *		5 -18,445	
Wall Co	ond	5,255	310		5,565	11.34	٤ 5,	255		,	4 -14,263	
Partiti	ion	-93			-93	-0.19	k		-0.19 *	-67	1 -671	
Exposed	d Floor	0			0				0.00 *			
Infilt		0			0	0.00					0 -78,640	66.20
		34,431	310		34,791	70.89	k 34,	481	70.11 *	-117,69	4 -118,762	99.98
Internal						:	K		*			
Lights		4.803	0		4,803	9.79	4 ,	803	9.77 *		0 0	0.00
People		2,974			2,974	6.06	1,	454	2.96 *		0 0	0.00
Misc		0	0	0	0	0.00	ķ	0	0.00 *		0 0	0.00
	tal==>	7,776	0	0	7,776	15.84	6,	256	12.72 *		0 0	0.00
			-1,737		0	0.00	k 1,	933	3.93 *	-1,45	.3 0	0.00
Outside A		5	0	_	0	0.00	k	0	0.00 *		0 0	0.00
Sup. Fan					0	0.00	ķ		0.00 *		0	0.00
Ret. Fan			0		0	0.00	ķ .		0.00 *		0	0.00
Duct Heat			0		0	0.00	ķ		0,00 *		0	0.00
DV/UNDR S		ó,513			6,513	13.27	k 6,	513	13.24 ×	-2	4 -24	0.02
Exhaust i	_	,	0	0	0	0.00	ŧ		0.00 *		0	
Terminal	Sypass		0	0	0	0.00	k		0.00 *		0	0.00
							ţ		*			
Grand To	tal==>	50,508	-1,427	. Ů	49,081	100.00	¥ 49,	184	100.00 *	-119,17	1 -118,787	100.00
				LING COIL SE	LECTION						AREAS	
	Total	Capacity	Sens Cap.	Coil Airfl	Enteri	ng DB/WB/H	R Leav	ing DE	B/WB/HR	Gross Tota	l Glass (sf) (%)
				(cfm)				Deg F	Grains	Floor	3,520	
			47.6		75.9 6			58.0	68.0	Part	300	
ux Clg	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	ExFlr	0	
	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	Roof	1,840	0 0
otals	4.1	49.1								Wall	2,754	512 19
	UEATTM	r rati esi	ECTION		^T	DELONG (of	n)	1	ENGINEERING	CHECKS	TEMPERATUR	FS (F)
				Lvg					3 % OA			g Htg
1			m) Deg F	Deg F	Vant	n			Cfm/Sqft	0.97		.8 100.0
ain ∐+a	-122.			100.0	Vent Infil	Δ·	0 1,129	01:	g Cfm/Ton	836.18		.9 66.4
ain Htg	-177.	1 3,	0 0.0	0.0	Supply	3 420	3 420	013	g Sqft/Ton			.9 67.2
ux Htg	0.	0 3,	420 67.2		Mincfm	0	0,420	01	g Btuh/Sqft			.9 67.2
reheat	-0.	v 2,	420 67.2 C 0.0	0.10	Return	7 120	V ACK 7	No.	. People		•	.0 68.0
eheat	0.	٥	0 0.0						g % OA	0.0		0.0
umidif	0.	0 0 0	0.0		Exhaust	0	0	п с ; Ц+.	g Cfm/SqFt	0.7		0.0
pt Vent	0.	V	0.0		Rm Exh	0	0	п				
otal	488	•			Auxil	0	Λ.	U+.	g Btuh/SqFt	-71 Ka	Fn Frict (10 0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

							m U-Val ı/hr/sqf	ues t/f)				Room Mass	Room Capac.
Room					Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Des	cription	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST	FLOOR	0.124	0.000	0.000	0.000	0.000	0.550	0.563	0.141	0.549	74.3	17.05
2	2ND	FLOOR	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.060	0.000	19.1	7.29
Zone	1	Total/Ave.	0.124	0.000	0.000	0.000	0.057	0.550	0.563	0.100	0.549	45.4	11.95
System	1	Total/Ave.	0.124	0.000	0.000	0.000	0.057	0.550	0.563	0.100	0.549	45.4	11.95
Buildin		,		0.000		0.000					0.549	45.4	11.95
21171 271													

BUILDING AREAS - ALTERNATIVE 1 . BASE BUILDING

BUILDING AREAS-----

Nawpei Boow	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FLOOR	1	2	340	1,680	300	0	0	0	0	271	20	1,091
ż	2ND FLOOR	1	2	920	1,840	0	0	0	0	1,840	241	17	1,151
Zone	1 Total/Ave.				3,520	300	0	0	0	1,840	512	19	2,242
System	1 Total/Ave.			•	3,520	300	0	0	0	1,840	512	19	2,242
Buildin	g				3,520	300	0	0	0	1,840	512	19	2,242

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.183 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.133 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 18.49 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

System Totals

Percent	Cool	ing Loa	d	Heatir	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.2	0	0	-6,105	5	224	171.0	0	0	0.0	0	0
5 - 10	0.4	0	0	-12,210	3	124	342.0	0	0	0.0	0	0
10 - 15	0.6	0	0	-18,315	5	225	513.0	0	0	0.0	0	0
15 - 20	0.8	0	0	-24,420	8	352	684.0	42	2,120	0.0	0	0
20 - 25	1.0	0	0	-30,525	. 43	1,802	855.0	0	0	0.0	0	0
25 - 30	1.2	0	0	-36,630	6	265	1,026.0	0	0	0.0	0	0
30 - 35	1.4	0	0	-42,735	6	269	1,197.0	0	0	0.0	0	0
35 - 40	1.6	0	0	-48,840	5	195	1,368.0	0	0	0.0	0	0
40 - 45	1.8	0	0	-54,945	3	130	1,539.0	0	0	0.0	0	0
45 - 50	2.0	0	0	-61,050	3	113	1,710.0	21	1,060	0.0	0	0
50 - 55	2.2	0	0	-67,155	9	362	1,881.0	0	0	0.0	0	0
55 - 60	2.5	0	0	-73,260	0	4	2,052.0	0	0	0.0	0	0
60 - 65	2.7	0	0	-79,365	1	27	2,223.0	0	0	0.0	0	0
65 - 70	2.9	0	0	-85,470	0	0	2,394.0	0	0	0.0	0	0
70 - 75	3.1	0	0	-91,575	0	0	2,565.0	0	0	0.0	. 0	0
75 - 80	3.3	0	0	-97,680	0	19	2,736.0	0	0	0.0	0	0
80 - 85	3.5	0	0	-103,785	0	20	2,907.0	0	0	0.0	0	0
85 - 90	3.7	0	0	-109,890	0	20	3,078.0	0	O	0.0	0	0
90 - '95	3.9	0	0	-115,995	0	0	3,249.0	0	0	0.0	0	0
95 - 100	4.1	0	0	-122,100	2	87	3,420.0	38	1,908	0.0	0	0
Hours Off	0.0	0	8,760	. 0	. 0	4,522	0.0	0	3,672	0.0	0	8,760

Min. Temp.

Mo./Hr.

Day Type

63.9

2 15

2

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 BASE BUILDING

Temperature	Zone Number	
Range (F)	1	
Max. Temp.	100.9	and the second s
Mo./Hr.	8 21	
Day Type	1	
	Nonlan of Hanna	
Ab 100	Number of Hours	
Above 100	19	
95 - 100	1,633	
90 - 95	1,114	•
85 - 90	162	
80 - 85	366	
75 - 80 70 - 75	395	/
65 - 70	238 4,679	
60 - 65	154	
55 - 60	0	•
50 - 55	0	
	V	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION-

M	ELEC Off Peak	DEMAND On Peak	GAS On Peak	GAS DMND On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	2,464	4	407	1
Feb	2,226	4	404	1
March	2,476	4	271	1
April	1,706	4	112	0
May	472	2	0	. 0
June	460	2	0	0
July	460	2	0	0
Aug	477	2	0	0
Sept	449	2	. 0	0
Oct	864	4	32	0
Nov	2,222	4	173	1
Dec	2,458	4	337	1
Total	16,734	4	1,737	1

Building Energy Consumption = 65,560 (Btu/Sq Ft/Year)
Source Energy Consumption = 100,611 (Btu/Sq Ft/Year)

Floor Area = 3,520 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	•	· · · · · · · · · · · · · · · · · · ·					-	umption			0.+		N	
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													* .
	ELEC	466	421	477	449	472	460	460	477	449	472	449	460	5,511
	PK	1.8	1.3	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
1	MISC LD		,											
•	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
•	MTCO ID													•
2	MISC LD GAS	0	C	0		٥	٥	0	0	0	0	0	۸	0
	bk gun	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		V.V	0.0	V, V	٧.٧	V.V	0.0	. V.V	0.0	0.0	V.V	V.V	0.0	V.V
3	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				_									
	OIL	0	0	0	0	0	0	0.0	0	0.0	0	0 0.0	0	0 0.0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	PSTEAM	0	0	0	0 0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0	0 .	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0 -	. 0	. 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0
1	EQ1000		DOE	ENTS COO	ITNC ENE	DCV								
1	ELEC	0	0	0	0	0	0	0	0	ō	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							•							
1	EQ5001	_		LED WATE				_		*				
	ELEC	0	0		0			Ō		0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5010		COND	ENSER WA	TER PUMP	C.V.								•
	ELEC	0	0	0	0	Ō	0	0	0	0	0	Ō	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2454		RESI	DENT GAS	FURNACE	W-FAN								
	GAS	407	404	271	112	0	0	0	0	Ō	32	173	337	1,737
	PK	1.5	1.5	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.3	0.5	1.3	1.5
1	EQ5254		REST	DENTIAL	FURNACE	FAN								
•	ELEC	1999	1805	1999	1257	0	0	0	0	0	392	1773	1999	11,223
	PK	2.7	2.7	2.7	2.7	0.0	0.0	0.0	0.0	0.0	2.7	2.7	2.7	2.7
												·		

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 BASE BUILDING

U	I	Ł	Ι	T	Y	р	Ε	Α	K	(; }	Н	Ē	Ĉ	K	S	U	М	S	
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UTILITY PEAK	CHECKSUMS
Utility ELECTRIC DEMAND	
Peak Value 4.4 (kW) Yearly Time of Peak 6 (hr) 1 (mo)	
Hour 6 Month 1	
Sub Total	0.0 0.00
Heating Equipment	
1 EQ2454 RESIDENT GAS FURNACE W-FAN	2.7 60.42
Sub Total .	2.7 60.42
Sub Total	0.0 0.00
Sub Total	0.0 0.00
Miscellaneous	
Lights Base Utilities Misc Equipment Sub Total	1.8 39.58 0.0 0.00 0.0 0.00 1.8 39.58
Grand! Total	4.4 100.00

***************************** ************************** ** TRACE 600 ANALYSIS ** ** ** ** ************************ *******************************

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 205

Weather File Code: CARLISLE ENERGY SAVINGS OPPORTUNITY STUDY Location: Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: (F) Winter Design Dry Bulb: (F) 4 Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) 0.2444 (8tu/lbm/F) Air Specific Heat: Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (8tu-min./hr/cuft) 4.4519 (Lb-min./hr/cuft) Enthalpy Factor: Design Simulation Period: May To September

System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

1/12/94 Time/Date Program was Run: 14:31: 7 CB205 .TM

Dataset Name:

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

. SYSTEM SUMMARY ------ SYSTEM SUMMARY ------ (Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow _% (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	3,420	3,420	4,494	1,074	0	0
Totals		0	3,420	3,420	4,494	1,074	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

------ Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) Number Type (Tons) (Tons) (Tons) 4.3 0.0 0.0 4.3 -109,516 0 0 -109,516 1 SZ 4.3 -109.516 0 -109,516 0 0 Totals 4.3 0.0 0.0 0

The building peaked at hour 16 month 9 with a capacity of 4.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

Percent ----- Cooling ---- Heating ---Outside Cfm/ Cfm/ Btuh/ Floor Area System Main/ System Cfm/ Sq Ft 8tuh/ Number Auxiliary Type Air Sq Ft Ton /Ton Sq Ft Sq Ft Sq Ft Sq Ft 1 Main 0.00 0.97 798.9 822.3 14.59 0.97 -31.11 3,520 SZ

System 1 Peak SZ - SINGLE ZONE

	t Time ==		Mo/Hr: 9 DB/WB/HR: 8		n		*	Mo/Hr: OAD8:			Mo/Hr: 13 OADB:	-	
0015108	H11/	UH	DO/WO/NK: C	33/ 04/ 03.1	·		*	OHUU.	3		OHUU.	7	
		Space		Ret. Air		Percnt		Space					Perchi
		ens.+Lat.	Sensible	Latent	Total			Sensible		•			Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)			(Btuh)	(%) *			uh)	(\$)
Skylit		0	0		0			0	0.00 *			0	0.00
Skylit		0	0		0			0	0.00 *		•	0	0.00
Roof C		2,117	0		2,117			2,117			-	144	2.92
Glass		21,474	0		21,474			21,474			0	0	0.00
Glass		1,671	0		1,671			1,671			45 -18,		17.11
Wall C		3,921	192		- 4,113			3,921	7.80 *		50 -8 ,		7.78
Partit		-93			-93			-93					0.62
•	d Floor	0			0			0	0.00 *		-		0.00
Infilt		0			0			0	0.00 *	-	04 -74,		
	tal==>	29,090	192	•	29,282	57.00		29,090		•	13 -105,	448	97.80
Internal							*		*			-	
Lights		4,803	0		4,803			4,803			0	0	0.00
People		2,974			2,974			1,454			0	0	0.00
Misc		0	0	0	0			0	0.00 *		0	0	0.00
	tal==>	7,776	0	0	7,776	15.14		6,256			0	0	0.00
Ceiling		451	-451		0			583	1.16 *			0	0.00
	Air	0	0	0	0			0	0.00 *		0	0	0.00
Sup. Fan					0				0.00 *			0	0.00
Ret. Fan			0		. 0				0.00 *			0	0.00
Duct Hea			0		0	0.00			0.00 *			0	0.00
OV/UNDR	-	14,312			14,312			14,312			73 -2,	373	2.20
Exhaust			0	0	0				0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
Grand;To	tal==>	51,629	-259	0	51,370	100.00	*	50,241	•		-107,	821	100.00
			cool	ING COIL SE	LECTION						AREAS		
	Total (Capacity	Sens Cap.	Coil Airfl	Enteri	ng D8/W8/	HR	Leaving	DB/WB/HR	Gross Tota	al Glas	s (sf	(%)
į	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	g F Grai	ns De	eg F Deg	F Grains	Floor	3,520		
ain Clg	4.3	51.4	49.9	3,420 .	75.2 67	2.5 66	.5 6	51.5 57.	6 66.4	Part	300		
ux Clg	0.0	0.0	0.0	0	0.0	0.0	. 0	0.0 0.	0.0	ExFlr	0		
	0.0	0.0	0.0	0	0.0	0.0	.0	0.0 0.	0.0	Roof	1,840		0 0
otals		51.4								Wall	2,754	5	12 19
	HEATIN		ECTION				-		-ENGINEERING	CHECKS	TEMPERA		
	Capacity		irfl Ent		Type .					0.0	Туре	Clg	
	(Mbh)				Vent	0		0 0	lg Cfm/Sqft		SADB	61.5	
ain Htg	-109.				Infil	0	1	1,074 0	lg Cfm/Ton		Plenum	75.5	
ux Htg	0.0				Supply	3,420	3		lg Sqft/Ton		Return	75.2	
reheat	-0.0				Mincfm	0		0 0	lg Btuh/Sqft	14.59	Ret/OA	75.2	
eheat	0.0		0.0		Return	3,420	3	3,420 N	lo. People itg % OA	8	Runarnd	75.0	
umidif	0.0)	0.0		Exhaust	0		0 ł	itg % OA	0.0	Fn MtrTD	0.0	
pt Vent	0.0		0 0.0		Rm Exh	0			Itg Cfm/SqFt		Fn BldTD	0.0	
otal	-109.5	;			Auxil	0		0 ł	ltg Btuh/SqFt	-71 11	Fn Frict	0.0	0.1

BUILDING U-VALUES - ALTERNATIVE 2
WALL & ROOF INSULATION

------ BUILDING U-VALUES------

					Roo (Btu	m U-Val /hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr		-	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FLOOR	0.124	0.000	0.000	0.000	0.000	0.550	0.563	0.057	0.549	75.1	17.20
2	2ND FLOOR	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.060	0.000	20.1	7.49
Zone	1 Total/Ave.	0.124	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.549	46.3	12.13
System	1 Total/Ave.	0.124	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.549	46.3	12.13
Buildin	g	0.124	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.549	46.3	12.13

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

Room Number	Description	Number Dupl:		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FLOOR	1	2	840	1,680	300	0	0	0	0	271	20	1,091
2	2ND FLOOR	1	2	920	1,840	0	0	0	0	1,840	241	17	1,151
Zone	<pre>1 Total/Ave.</pre>				3,520	300	0	0	0	1,840	512	19	2,242
System	1 Total/Ave.				3,520	300	0	0	0	1,840	512	19	2,242
Buildir	ng				3,520	300	0	0	0	1,840	512	19	2,242

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.150 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.101 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 17.21 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.2	0	0	-5,476	5	204	171.0	0	0	0.0	0	0
5 - 10	0.4	0	0	-10,952	3	134	342.0	0	0	0.0	0	0
10 - 15	0.6	0	0	-16,427	6	247	513.0	0	0	0.0	0	0
15 - 20	0.9	0	0	-21,903	10	398	684.0	42	2,120	0.0	0	0
20 - 25	1.1	0	0	-27,379	42	1,729	855.0	0	0	0.0	0	0
25 - 30	1.3	0	0	-32,855	7	292	1,026.0	0	0	0.0	0	0
30 - 35	1.5	0	0	-38,330	6	238	1,197.0	0	0	0.0	0	0
3540	1.7	0	0	-43,806	4	164	1,368.0	0	0	0.0	0	0
40 - 45	1.9	0	0	-49,282	3	140	1,539.0	0	0	0.0	0	0
45 - 50	2.1	0	0	-54,758	2	73	1,710.0	21	1,060	0.0	0	0
50 - 55	2.4	0	0	-60,234	8	352	1,881.0	0	0	0.0	0	0
55 - 60	2.6	0	0	-65,709	0	10	2,052.0	0	0	0.0	0	0
60 - 65	2.8	0	0	-71,185	0	17	2,223.0	0	0	0.0	0	0
65 - 70	3.0	0	0	-76,661	0	0	2,394.0	0	0	0.0	0	0
70 - 75	3.2	0	0	-82,137	1	30	2,565.0	0	0	0.0	. 0	0
75 - 80	3.4	0	0	-87,613	1	29	2,736.0	0	0	0.0	0	0
80 - 85	3.6	0	0	-93,088	0	0	2,907.0	0	0	0.0	0	0
85 - 90	3.9	0	0	-98,564	0	0	3,078.0	0	0	0.0	0	0
90 - 95	4.1	0	0	-104,040	0	9	3,249.0	0	0	0.0	0	0
95 - 100	4.3	0	0	-109,516	2	78	3,420.0	38	1,908	0.0	0	0
Hours Off	0.0	0	8,760	0	0	4,616	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

		BUILDING TEMPERATURE PROFILES
Temperature		Zone Number
Range (F)	1	
Max. Temp.	102.6	
Mo./Hr.	8 21	
Day Type	1	
		Number of Hours
Above 100	566	
95 - 100	1,583	
90 - 95	707	
85 - 90	92	
80 - 85	240	
75,- 80	586	
70 ¹ - 75	322	
65 - 70	4,580	
60 - 65	84	
55'- 60	0	
50 - 55	0	
Below 50	0	
Min. Temp.	64.5	
Mo./Hr.	2 15	
Day Type	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND	GAS	GAS DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	2,258	4	351	1
Feb	2,040	4	353	1
March	2,270	4	235	1
April	1,576	4	97	0
May	472	2	0	0
June	460	2	0	0
July	460	2	0	0
Aug	477	2	0	0
Sept	449	2	. 0	0
Oct	744	4	20	0
Nov ·	1,870	4	141	0
Dec	2,252	4	287	1
Total	15,329	4	1,482	1

Building Energy Consumption = 56,966 (Btu/Sq Ft/Year) Source Energy Consumption = 88,913 (Btu/Sq Ft/Year)

Floor Area = 3,520 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

Ref	Equip -					Mont	hly Cons	umption -						*
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
	LIGHTS													
	ELEC	466	421	477	449	472	460	460	477	449	472	449	460	5,511
	PK	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	MISC LD					•				^	^	^	٥	
	ELEC	0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0 0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD	٥	^	۸		^	۸	۸	٨	٨	0	۸	0	0
	GAS PK	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0
	!	0.0	0.0	V.V	0.0	0.0	0.0		0.0	۷.۷	0.0	V.V	0.0	0,0
	MISC LD	۸	٨	۸	۸	0	۸	0	0	0	0	0	0	0
	OIL PK	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	٧.٠	V.V	0.0	0.0	0.0	V.V	0.0	0.0	• • • • • • • • • • • • • • • • • • • •	010	•••	
	MISC LD P STEAM	0	0	0	0	0	0	0	0	0	0	0	0 .	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	Þ HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD													
	P CHILL	0	0	0 .	0	0	0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ1000			ENTS COO			•	^	^	^	^	۸	^	
	ELEC	0	0	0	0 0.0	0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.V	0.0	0.0	0.0
	EQ5001			LED WATE								•	•	
	ELEC	0	0	0			0		0.0	0.0	0.0	0.0	0.0	0.0
	PΚ	0.0	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	EQ5010		COND	ENSER WA										
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ2454			DENT GAS										
	GAS	351	353	235	97	0	0	0	0	0	20	141	287	1,482
	PK	1.3	1.3	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.5	1.0	1.3
	EQ5254			DENTIAL									(707	A
	ELEC	1793	1619	1793	1128	0	0	0	0	0	272	1422	1793	9,818
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

	UTILITY	PEAK	CHECKSUMS
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0 1 1 1 1	PEHA	CHEC	, 1, 3, 0, 11	J
Utility ELECTRIC DEMAND				
Peak Value 4.2 (kW) Yearly Time of Peak 6 (hr) 1 (mo)				
Hour 6 Month 1				
Sub Total		0.0	0.00	
Heating Equipment				
1 EQ2454 RESIDENT GAS FURNACE W-FAN		2.4	57.79	
Sub Total .		2.4	57.79	
Sub Total		0.0	0.00	
Sub Total		0.0	0.00	
Miscellaneous				
Lights Base Utilities Misc Equipment Sub Total			42.21 0.00 0.00 42.21	
Grand Total		4.2	100.00	

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                         **
      TRACE 600
             ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 205

Weather File Code: CARLISLE ENERGY SAVINGS OPPORTUNITY STUDY . Location: Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 475 (ft) Elevation: Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) 72 (F) Summer Dasign Wet Bulb: ! Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) 0.2444 (Btu/lbm/F) Air Specific Heat: Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F) 4,790.2 (Btu-min./hr/cuft) Latent Heat Factor: 4.4519 (Lb-min./hr/cuft) Enthalpy Factor: Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

14:33:53 1/12/94 Time/Date Program was Run: C8205 .TM Dataset Name:

AIRFLOW - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

------ S Y S T E M S U M M A R Y ------ (Design Airflow Quantities)

				Auxil.	Room			
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 Totals	SZ	0	3,420 3,420	3,420 3,420	4,301 4,301	381 381	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

------ Cooling -------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Mumber Type (Tens) (Tens) (Tens) (Tens) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (8tuh) 0 0 0 0 -104,977 4.1 0.0 0.0 4.1 -104,977 0 : SZ 0 0 0 -104,977 0.0 4.1 -104,977 0 0 Totals 4.1 0.0

The building peaked at hour 16 month 9 with a capacity of 4.1 tons

ENGINEERING CHECKS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

System 1 Peak SZ - SINGLE ZONE

-,	_												
******	:******	******	COOLING COIL	PEAK ****	*****	******	***** CLG	SPACE	PEAK ****	***** HEAT	ING COIL P	EAK ***	****
	t Time ==								9/16 *		Mo/Hr: 13		
			ADB/WB/HR:		0		* 0		83 *		OADB:	4	
			0.3. 45	D-1 A:-	No.4		*		·		t coil n	aak D	orent
	_	Space		Ret. Air				•	Percnt *	Space Sen	k Coil P		ercnt f Tot
5)		Sens.+Lat.			Total		* 5682 * (b	ible					(%)
		(Btuh)		(Btuh)					(%) * 0.00 *	(btui) (or	011)	0.00
Skylit	e Soir	0	0		0				0.00 *		0	0	0.00
Skylit	e Cond	0	0		0							744	6.63
Root C	ond	8,241	0							-6,74	4 ⁻⁰ ,	744	0.00
			0				+ 18	,3/4	01.00 ↑ C CA ↓	_10 ##	0 5 -18,	445	
			0		2,704				5.50 *	-18,44	14 14	943	18.14
			310		5,565				10.68 *	-13,19	14 -14,	203 (71	14.03
		-93			-93			-93	-0.19 *	-67	'1 -	0/1	0.66
		0			0		¥ 		0.00 *		0		0.00
		0				0.00				-61,37	7 -01,	5//	60.37
		34,481	310		34,791			,481	70.11 *		1 -101,	500	99.84
Internal						0.70		007	*		۸	^	0.00
Lights			0				¥ 4	,803	9.77 *		0	0	0.00
		2,974		0		6.06	* 1	,454	2.96 *		0	0	0.00
Misc		0		0		0.00			0.00 *			0	0.00
		7,776		0	7,776	15.84	* 6	,256	12.72 *		0	0	0.00
Ceiling	Load	1,737	-1,737		0	0.00	* 1	,933	3.93 *	-1,45	3	0	0.00
Outside		0	0	0	0		*	0	0.00 *		0	0	0.00
Sup. Fan						0.00			0.00 *			0	0.00
Ret. Fan			0			0.00			0.00 *			0	0.00
Duct Hea			0		0				0.00 *			0	0.00
OV/UNDR	-	6,513			6,513	13.27	* 6	,513	13.24 *		.4 -		0.16
Exhaust			0		0	0.00	*		0.00 *			0	0.00
Termihal	8ypass		0	0	0	0.00	*		0.00 *			0	0.00
							*	104	100 00 4	100.04	0 101		60 00
Grand To	tal==>	50,508	-1,427	. 0	49,081	100.00	* 49	,184	100.00 *	-102,04	8 -101,	664 1	90.00
			000	LING COIL SE	ELECTION						AREAS		
						ng DB/WB/H	R Leav	ving D	B/WB/HR	Gross Tota		s (sf)	(%)
			(Mbh)						Grains	Floor			
Main Clg	4.1	49.1	47.6	3,420 .	75.9 62					Part			
Aux Clg	0.0	0.0	0.0	0).0 0.		0.0		ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		1,840	0	
Totals	4.1	49.1				•				Wall	2,754	512	19
	HEATIN	G COIL SEL	ECTION		AIF	RFLOWS (cf	m)	!	ENGINEERING	CHECKS	TEMPERA	TURES (F)
	Capacit	y Coil A	irfl Ent	Lvg	Type .	Cooling	Heating		g % OA	0.0	Type	Clg	Htg
	(Mbh)	(cf			Vent	0	0	Cl	g Cfm/Sqft	0.97	SADB	61.8	95.4
Main Htg	-105.		420 67.2		Infil	0	881		g Cfm/Ton	836.18	Plenum	76.9	66.4
Aux Htg	0.		0.0		Supply	3,420	3,420	Cl	g Sqft/Ton	860.63	Return	75.9	67.1
Preheat	-0.		420 67.2		Mincfm	0	0	Cl	g Btuh/Sqft	13.94	Ret/OA	75.9	67.2
Reheat	0.		0 0.0		Return	3,420	3,420	Nо	. People	8	Runarnd	75.0	68.0
Humidif	0.		0 0.0		Exhaust	0	0	Ht	g % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.		0.0		Rm Exh	0	0	Ht	g Cfm/SqFt	0.97	Fn BldTD	0.0	0.0
Total	-105.				Auxil	0	0	Ht	g Btuh/SqFt	-29.82	Fn Frict	0.0	0.1
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BUILDING U-VALUES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- BUILDING U-VALUES-----

		Room U-Values (Btu/hr/sqft/F)									Room Mass	Room Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FLOOR	0.124	0.000	0.000	0.000	0.000	0.550	0.563	0.141	0.549	74.3	17.05
2	2ND FLOOR	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.060	0.000	19.1	7.29
Zone	<pre>1 Total/Ave.</pre>	0.124	0.000	0.000	0.000	0.057	0.550	0.563	0.100	0.549	45.4	11.95
System	1 Total/Ave.	0.124	0.000	0.000	0.000	0.057	0.550	0.563	0.100	0.549	45.4	11.95
Buildin	g	0.124	0.000	0.000	0.000	0.057	0.550	0.563	0.100	0.549	45.4	11.95

BUILDING AREAS - ALTERNATIVE 3 ... WEATHERSTRIP & CAULKING

BUILDING AREAS-----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
i	1ST FLOOR	1	2	840	1,680	300	0	0	0	0	271	20	1,091
2	2ND FLOOR	1	2	920	1,840	0	0	0	0	1,840	241	17	1,151
Zone	1 Total/Ave.				3,520	300	0	0	0	1,840	512	19	2,242
System	1 Total/Ave.			-	3,520	300	0	0	0	1,840	512	19	2,242
Buildin	g				3,520	300	0	0	0	1,840	512	19	2,242

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.183 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.133 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 18.49 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

System Totals

Percent	Cooling Load		Heating Load			Cooling	Airflow		Heating Airflow			
Design Load	Cap. (Ton)			Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.2	0	0	-5,249	3	111	171.0	0	0	0.0	0	0
5 - 10	0.4	0	0	-10,498	3	121	342.0	0	0	0.0	0	0
10 - 15	0.6	0	0	-15,747	6	239	513.0	0	0	0.0	0	0
15 - 20	0.8	0	0	-20,995	9	343	684.0	42	2,120	0.0	0	0
20 - 25	1.0	0	0	-26,244	44	1,740	855.0	0	.0	0.0	0	0
25 - 30	1.2	0	0	-31,493	7	262	1,026.0	0	0	0.0	0	0
30 - 35	1.4	0	0	-36,742	7	274	1,197.0	0	0	0.0	0	0
35 - 40	1.6	0	0	-41,991	5	207	1,368.0	0	0	0.0	0	0
40 - 45	1.8	0	0	-47,240	3	121	1,539.0	0	0	0.0	0	0
45 - 50	2.0	0	0	-52,488	1	40	1,710.0	21	1,060	0.0	0	0
50 - :55	2.2	0	0	-57,737	9	366	1,881.0	0	0	0.0	0	0
55 - '60	2.5	0	0	-62,986	0	4	2,052.0	0	0	0.0	0	0
60 - 65	2.7	0	0	-68,235	1	23	2,223.0	0	0	0.0	0	0
65 - 70	2.9	0	0	-73,484	0	0	2,394.0	0	0	0.0	0	0
70 - 75	3.1	0	0	-78,733	1	30	2,565.0	0	0	0.0	. 0	0
75 - 80	3.3	0	0	-83,982	1	38	2,736.0	0	0	0.0	0	0
80 - 85	3.5	0	0	-89,230	0	19	2,907.0	0	0	0.0	0	0
85 - 90	3.7	0	0	-94,479	0	0	3,078.0	0	0	0.0	0	0
90 - 95	3.9	0	0	-99,728	0	0	3,249.0	0	0	0.0	0	0
95 - 100	4.1	0	0	-104,977	1	59	3,420.0	38	1,908	0.0	0	0
Hours Off	0.0	0	8,760	0	0	4,763	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

		BUILDING TEMPERATURE PROFILES
Temperature		Zone Number
Range (F)	1	
Max. Temp.	100.9	
Mo./Hr.	8 21	
Day Type	1	
		Number of Hours
Above 100	19	
95 - 100	1,633	
90 - 95	1,114	
85 - 90	162	
80 - 85	366	
75 80	463	
70 - 75	335	
65 - 70	4,612	
60 - 65	56	
55 - 60	0	
50 - 55	0	
Below 50	0	
Min. Temp.	64.8	
Mo./Hr.	2 15	
Day Type	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ MONTHLY ENERGY CONSUMPTION ------

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	GAS On Peak (Therm)	GAS DMND On Peak (Thrm/hr)
Jan	2,184	4	342	1
Feb	1,973	4	337	1
March	2,196	4	221	1
April	1,285	4	77	0
May	472	2	0	0
June	460	2	0	0
July	460	2	0	0
Aug	477	2	0	0
Sept	449	2	. 0	0
Oct	716	4	20	0
Nov :	1,788	4	139	0
Dec	2,178	4	284	1
Total	14,638	4	1,420	1

Building Energy Consumption = 54,541 (Btu/Sq Ft/Year) Source Energy Consumption = 85,054 (Btu/Sq Ft/Year)

Floor Area = 3,520 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION -------

Ref	Equip -					Mont	thly Cons	umption						
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	466	421	477	449	472	460	460	477	449	472	449	460	5,511
	ЬK	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
1	MISC LD												_	_
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD	^		^		٨	^	^	۸	^	٥	^		2
	GAS	0	0	0	0	0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD OIL	٨	0	۸	0	۸	۸	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	0.0	0.0	0.0	V.V	V.V	٧.٧	V.V	0.0	0.0	0.0	0.0	0.0
4	MISC LD P STEAM	0	0	0	0	0	0	0	0	0	0	0	0 .	0
	ķΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
•	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0 .	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1000			ENTS COO										_
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	ŖΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
i	EQ5001			LED WATE	_		۸	۸	٥	٥		^	۸	
	ELEC	0	0	0	0		0		0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5010			ENSER WA		C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2454			DENT GAS										
	GAS	342	337	221	77	0	0	0	0	0	20	139	284	1,420
	PK	1.3	1.3	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.4	1.0	1.3
1	EQ5254			DENTIAL								4	4716	
	ELEC	1718	1552	1718	836	0	0	0	0	0	245	1340	1718	9,127
	PK	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.3

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

0112111 724 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		-UTILITY	PEAK	CHECKSUMS	
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UTILITY PEAK	CHEC	KSUMS
Utility ELECTRIC DEMAND		
Peak Value 4.1 (kW) Yearly Time of Peak 6 (hr) 1 (mo)		
Hour 6 Month 1		
Sub Total	0.0	0.00
Heating Equipment		
1 EQ2454 RESIDENT GAS FURNACE W-FAN	2.3	56.75
Sub Total .	2.3	56.75
Sub Tptal	0.0	0.00
Sub Total	0.0	0.00
Miscellaneous		
Lights Base Utilities Misc Equipment Sub Total		43.25 0.00 0.00 43.25
Grand [!] Total	4.1	100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 205

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5

Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:36:51 1/12/94

Dataset Name: CB205 .TM

AIRFLOW - ALTERNATIVE 4 COMBINED ECOS

-----SYSTEM SUMMARY -------(Design Airflow Quantities)

					Auxil.	Room		
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 :	SZ	0	3,420	3,420	4,219	799	0	0
Totals		0	3,420	3,420	4,219	799	0	0

CAPACITY - ALTERNATIVE 4
COMBINED ECOS

------ Cooling ------ Heating -------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 4.3 0.0 0.0 4.3 -90,126 0 -90,126 0 0 Totals 4.3 0.0 0.0 4.3 -90.126 0 0 0 0 0 -90.126

The building peaked at hour 16 month 9 with a capacity of 4.3 tons

ENGINEERING CHECKS - ALTERNATIVE 4 COMBINED ECOS

System 1 Peak SI - SINGLE ZONE

	at Time		COOLING COIL Mo/Hr:			******							******
			ADB/MB/HR:		0				83		mo/Hr: OADB:		
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space		k K Space P	eak Coi	l Peak	Percnt
		Sens.+Lat.	Sensible	Latent	Total	Of Tot		nsible				t Sens	Of Tot
Envelope	e Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	•	uh)		(%)
Skylit	te Solr	0	0		0			0	0.00			0	0.00
Skylit	te Cond	0	Sensible (Btuh) 0 0 0 0		0	0.00	*	0	0.00	ţ .	0	0	
Roof C	Cond	2,117	0		2,117	4.12	*	2,117			144	-3,144	3.55
Glass	Solar	21,474	0		21,474			21,474	42.74	*		0	0.00
Glass	Cond	1,671	0		1,671	3.25	*	1,671	3.33	-18,	445 -	18,445	20.86
Wall C	Cond	0,721	1/4		4,113	8.01	*	3,921	7.80	-7.	950	-8,385	9.48
Partit	tion	-93			-93	-0.18	*	-93	-0.19	· –	671	-671	0.76
Expose	ed Floor	0			0	0.00	*	0	0.00	(0	0	0.00
Infilt	ration	0			0	0.00	*	0	0.00	-55,	623 -	55,623	62.90
Sub To	otal==>	29,090	192		29,282	57.00	*	29,090	57.90	-85,	832 -		
Internal	Loads						*		k				
	5	4,803	0		4,803	9.35			9.56		0	0	0.00
People	:	2,974	0		2,974	5.79	*	1,454	2.89 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
		7,776		0	7,776	15.14	*	6,256	12.45 *		0	0	0.00
		451			0	0.00	*	583	1.16 *		706	0	0.00
Outside	Air	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sup. Fan	Heat				0	0.00	*		0.00 *			0	0.00
Ret. Fan	Heat		0		0	0.00			0.00 *			0	0.00
Duct Hea	t Pkup		0		. 0	0.00	*		0.00 *			0	0.00
OV/UNDR	Sizing	14,312			14,312	27.86	*	14,312	28.49 *	-2,	164	-2,164	2.45
Exhaust	Heat		0	0	0				0.00 *			0	0.00
Termihal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
Grand To	tal==>	51,629	-259	- 0.	51,370	100.00	*	50,241	100.00 *	-88,7	702 -8	38,432	100.00
		~~~~~	cool	ING COIL S	ELECTION						AREAS	}	
	Total	Capacity	Sens Cap.	Coil Airfl	Enterin	g DB/WB/H	R L	eaving (	)8/W8/HR	Gross Tot	tal G	lass (s	f) (%)
			(Mbh)							Floor			
Main Clg	4.3	51.4	49.9	3,420 .	75.2 62	.5 66.	5 61.	5 57.6	66.4	Part	300		
Aux Clg	0.0	0.0	0.0	0	0.0 0	.0 0.	0 0.	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0 0.	0.0	0.0	Roof	1,840		0 0
Totals	4.3	51.4				•				Wall	2,754		512 19
			ECTION						-ENGINEERING				S (F)
	Capaci			-		Cooling	Heatin		lg % DA	0.0	Type	Clg	_
	(Mbh		_	-	Vent	0			g Cfm/Sqft		SAD8	61.	5 91.8
Main Htg	-90			91.8	Infil	0	71		g Cfm/Ton		Plenum	75.	
Aux Htg	0			0.0		3,420	3,4		g Sqft/Ton		Return	75.2	
Preheat	-0			61.5	Mincfm	0			.g 8tuh/Sqft		Ret/OA	75.	2 67.6
Reheat	0		0.0	0.0	Return	3,420	3,42		). People	8	Runarno		68.0
Humidif	0		0.0	0.0	Exhaust	0			g % OA		Fn Mtr1	0.0	0.0
Opt Vent	0		0.0	0.0	Rm Exh	0			g Cfm/SqFt		Fn BldT	D 0.0	0.0
Total	-90	1			Auxil	0		0 Ht	g Btuh/SqFt	-25.60	Fn Frio	t 0.6	0.1

BUILDING U-VALUES - ALTERNATIVE 4 COMBINED ECOS

------ BUILDING U-VALUES-----

Room U-Values(Btu/hr/sqft/F)											Room Mass	Room Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FLOOR	0.124	0.000	0.000	0.000	0.000	0.550	0.563	0.057	0.549	75.1	17.20
2	2ND FLOOR	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.060	0.000	20.1	7.49
Zone	1 Total/Ave.	0.124	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.549	46.3	12.13
System	<pre>1 Total/Ave.</pre>	0.124	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.549	46.3	12.13
Buildin	g	0.124	0.000	0.000	0.000	0.027	0.550	0.563	0.058	0.549	46.3	12.13

BUILDING AREAS -----

Room Number	Descr	ription		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	IST F	LOGR	1	2	840	1,680	300	0	0	0	0	271	20	1,091
2	2ND F	LCOR	1	2	920	1,840	0	0	0	0	1,840	241	17	1,151
Zone	1	Total/Ave				3,520	300	. 0	0	0	1,840	512	19	2,242
System	1	Total/Ave			•	3,520	300	0	0	0	1,840	512	17	2,242
Buildin	g					3,520	300	0	0	0	1,810	512	19	2,242

ASHRAE 90 ANALYSIS - ALTERNATIVE 4 COMBINED ECOS

------ A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.150 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.101 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 ( $\frac{3t}{4}$ ) ( $\frac{3t}{4}$ ) Ft) Wall Overall Thermal Transfer Value (OTTVw) = 17.21 ( $\frac{3t}{4}$ ) ( $\frac{3t}{4}$ ) Ft)

By: Trane Customer Direct Garvice Hetwork

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 COMBINED ECOS

## System Totals

Tercs.	nt	0561	ling Loc	1	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Dasi			Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Lo	દેવી	(Ton)	101		(Bluh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 -	5	0.2	0	0	-4,506	3	100	171.0	0	0	0.0	0	0
5 -	10	0.4	C	C	-9,013	5	181	342.0	0	0	0.0	0	0
10 -	15	0.6	0	0	-13,519	5	178	513.0	0	0	0.0	0	0
15 -	20	0.7	.)	0	-18,025	8	304	684.0	42	2,120	0.0	0	0
20 -	25	1.1	0	0	-22,532	46	1,738	855.0	0	0	0.0	0	0
25 -	30	1.3	0	0	-27,038	8	291	1,026.0	0	0	0.0	0	0
30 -	35	1.5	0	0	-31,544	5	195	1,197.0	0	0	0.0	0	0
35	40	1.7	0	0	-36,051	4	149	1,368.0	0	0	0.0	0	0
40 - '	45	1.9	0	0	-40,557	2	84	1,539.0	0	0	0.0	0	0
45 -	50	2.1	0	0	-45,063	2	75	1,710.0	21	1,060	0.0	0	0
50 -	55	2.4	0	0	-49,569	9	335	1,881.0	0	0	0.0	0	0
55 - 1	60	2.6	0	0	-54,076	1	34	2,052.0	0	0	0.0	0	0
60 -	65	2.8	0	0	-58,582	0	0	2,223.0	0	0	0.0	0	0
65 -	70	3.0	0	0	-63,088	1	48	2,394.0	0	0	0.0	0	0
70 -	75	3.2	0	0	-67,595	1	19	2,565.0	0	0	0.0	- 0	0
75 -	80	3.4	0	0	-72,101	0	9	2,736.0	0	0	0.0	0	0
80 -	85	3.6	0	0	-76,607	0	0	2,907.0	0	0	0.0	0	0
85 -	90	3.9	0	0	-81,114	0	0	3,078.0	0	0	0.0	0	0
90	95	4.1	0	0	~85,620	0	10	3,249.0	0	0	0.0	0	0
95 - 1	100	4.3	0	0	-90,126	1	49	3,420.0	38	1,908	0.0	0	0
Hours	Off	0.0	0	8,760	0	0	4,961	0.0	0	3,672	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

----- 8 U I L D I N G T E M P E R A T U R E P R O F I L E S ------------- Zone Number Temperature Range 1 (F) Max. Temp. 102.6 8 21 Mo./Hr. Day Type ...... Number of Hours ..... Above 100 566 95 - 100 1,583 90 - 95 707 85 - 90 92 80 - 85 291 75, - 80 845 70 - 75 107 65 - 70 4,569 60 - 65 0 55' - 60 50 - 55 0 Below 50 0 Min. Temp. 65.4 Mo./Hr. 2 15 Day Type

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

MONTHLY ENERGY CONSUMPTION

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	GAS On Peak (Therm)	GAS DMND On Peak (Thrm/hr)
Jan	1,941	4	278	1
Feb	1,753	4	278	1
March	1,952	4	178	1
April:	1,115	4	57	0
May	472	2	0	_ 0
June	460	2	. 0	0
July	460	2	0	0
Aug	477	2	0	0
Sept	449	2	. 0	0
Oct	581	4	7	0
Nov	1,389	4	99	0
Dec	1,935	4	227	1
Total	12,984	4	1,124	1

Building Energy Consumption = 44,517 (Btu/Sq Ft/Year)
Source Energy Consumption = 71,380 (Btu/Sq Ft/Year)

Floor Area = 3

3,520 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4
COMBINED ECOS

EQUIPMENT ENERGY CONSUMPTION

-														
Ref	Equip					Mont	hly Cons	umption						-
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS											•		
	ELEC	466	421	477	449	472	460	460	477	449	472	449	460	5,511
	PK	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
1	MISC LD					-								
_	ELEC	0	0	. 0	0	0	0	0	0	0	0.0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
_	GAS	0	0	0	0	0	0	0.0	0.0	0.0	0 0.0	0.0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	ÓΙL	0	0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
•	P STEAM	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	. 0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	. 0.0
5	MISC LD												_	
	P HOTH20	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	. 0.0
	MISC LD		_									Α.	*	Λ.
	P CHILL	0 0.0	0 0.0	0.	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>V.</b> V	٧.٧	V.V	
1	EQ1000			ENTS COO						^			*	۸
	ELEC	0	0	0	0	0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.V
1	EQ5001	_		LED WATE									*	
	ELEC	0		0	0.0	0	0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0		V.V	V.V	V.V
. 1	EQ5010		COND	ENSER WA	TER PUMP	C.V.								, -
	ELEC	0	0	0	0	0	Ō	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
i	EQ2454		RESI	DENT GAS	FURNACE	W-FAN								
	GAS	278	278	178	57	0	0	0	0	0	7	99	227	1,124
	PK	1.1	1.1	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.7	1.1 ·
í	EQ5254		RESI	DENTIAL	FURNACE	FAN								
	ELEC	1475	1332	1475	666	0	0	0	Ō	0	109	940	1475	7,473
	PK	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 COMBINED ECOS

Lights

Sub Total

Grand Total

Base Utilities

Misc Equipment

		UTILITY	PEAK	CHEC	KSUMS	3
Utility	ELECTRIC DE	MAND				
	e 3.7 ne of Peak	(kW) 6 (hr) 1 (mo)				
Hour 6 M	fonth 1					
Sub Total			_**	0.0	0.00	
Heating Ed	quipment					
1	EQ2454	RESIDENT GAS FURNACE W-FAN		2.0	52.98	
Sub Total				2.0	52.98	
Sub Total				0.0	0.00	
Sub Total				0.0	0.00	
Miscellane	eous					

1.8

0.0

0.0

1.8

3.7 100.00

47.02

0.00

0.00 47.02 Building 253
Trace Input File

```
CONTENTS OF : E:\CB253.TM
LINE #
   1
       JOB - 1
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   2
   3
      -01/CARLISLE BARRACKS. PA
       01/DEPARTMENT OF THE ARMY
   4
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 253
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
  12
       19/1/BASE BUILDING
       20/1/1/BASEMENT/3927/1//0//10
 13
  14
       20/2/1/RECEIVING/951/1//2//14
 15
       20/3/1/STORE/2067/1//2.75//14
 16
       20/4/1/LOBBY/768/1//2.75//14
  17
       20/5/2/BATH ROOMS/169/1//5.75//14
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
 18
  19
       21/M///CBADCTX///CBADHTX
  20
       22/2/1/YES////11
  21
       22/3/1/YES////11
       22/4/1/YES////11
  22
  23
       22/5/1/YES////11
       22/6/1/YES////146
  24
 25
       24/1/1/310/1//139/135
 26
       24/1/2/107/1//139/225
 27
       24/1/3/407/1//139/45
       24/2/1/660/1//140/135
  28
 29
       24/2/2/275/1//140/225
  30
       24/2/3/275/1//140/45
  31
       24/3/1/275/1//140/45
       24/4/1/660/1//141/315
 32
 33
       24/4/2/220/1//140/45
 34
       24/5/1/371/1//140/45
 35
       24/6/1/1207/1//142/135
       24/6/2/1156/1//142/225
 36
       24/6/3/1207/1//142/315
 37
 38
       25/2/1/5.25/3/5/1.04/.95
 39
       25/2/2/5.25/3/2/1.04/.95
 40
       25/4/1/5.5/5/10/1.04/.95
       25/5/1/3/1.5/4/1.04/.95
 41
       26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
 42
       26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
 43
       27/1/6/PEOPLE/255/255/1.14/WATT-SF/ASHRAE2
 44
 45
       27/2/2/PEOPLE/255/255/1.09/WATT-SF/ASHRAE2
       27/3/5/PEOPLE/255/255/2.24/WATT-SF/ASHRAE2
 46
       27/4/4/PEOPLE/255/255/.84/WATT-SF/ASHRAE2
 47
       27/6/3/PEOPLE/345/435/.80/WATT-SF/ASHRAE2
 48
       29/1/15/PCT-MCLG/0//612/CFM/612/CFM
 49
       29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
 50
 51
       29/3/15/PCT-MCLG/0//85/CFM/85/CFM
       29/4/15/PCT-MCLG/0//469/CFM/469/CFM
 52
       29/5/15/PCT-MCLG/0//170/CFM/170/CFM
 53
 54
       29/6/0/PCT-MCLG/0//850/CFM/850/CFM
 55
       30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
       30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
 56
 57
       30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
 58
       30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
```

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CONTENTS OF : E:\CB253.TM
LINE #
  59
       30/5/150/CFM/0/CFM///0/CFM/0/CFM
  60
       30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
  61
       31/1/1/1853/1//147/SINE-FIT/80/50
  62
       SYSTEM - 1
  63
       39/1/BASE BUILDING
  64
       40/1/SZ
       41/1/1/2
  65
       42/1/1.5/0/1///.2
  66
  67
       44/1/DRY-BULB/65/15
  68
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
       40/2/UH
  69
  70
       41/2/1/1/3/3
 71
       42/2//.25////.25
       45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
 72
 73
       40/3/RAD
       41/3/2/2
 74
 75
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
       EQUIPMENT - 1
 76
 77
       59/1/CARLISLE///BASE BUILDING
 78
       60/1/1/BLKPLANT/1/1
 79
       62/1/EQ1160S/1/25/TONS/87.9/KW
 80
       65/1/1//2/3
       67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
 81
 82
       69/1/EQ4003/EQ4003
 83
       69/2//E04003
 84
       LOAD - 2
 85
       19/2/WALL & ROOF INSULATION
 86
       20/1/1/BASEMENT/3927/1//0//10
 87
       20/2/1/RECEIVING/951/1//2//14
 88
       20/3/1/STORE/2067/1//2.75//14
 89
       20/4/1/LOBBY/768/1//2.75//14
 90
       20/5/2/BATH ROOMS/169/1//5.75//14
 91
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
      21/M///CBADCTX///CBADHTX
 92
      22/2/1/YES////180
 93
 94
      22/3/1/YES////180
      22/4/1/YES////180
 95
      22/5/1/YES////180
 96
      22/6/1/YES////146
 97
      24/1/1/310/1//139/135
 98
      24/1/2/107/1//139/225
 99
100
      24/1/3/407/1//139/45
      24/2/1/660/1//181/135
101
      24/2/2/275/1//181/225
102
      24/2/3/275/1//181/45
103
104
      24/3/1/275/1//181/45
      24/4/1/660/1//181/315
105
106
      24/4/2/220/1//181/45
      24/5/1/371/1//181/45
107
108
      24/6/1/1207/1//142/135
109
      24/6/2/1156/1//142/225
110
      24/6/3/1207/1//142/315
111
      25/2/1/5.25/3/5/1.04/.95
112
      25/2/2/5.25/3/2/1.04/.95
113
      25/4/1/5.5/5/10/1.04/.95
114
      25/5/1/3/1.5/4/1.04/.95
      26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
115
116
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
```

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CONTENTS OF : E:\CB253.TM
LINE #
       27/1/6/PEOPLE/255/255/1.14/WATT-SF/ASHRAE2
117
118
       27/2/2/PEOPLE/255/255/1.09/WATT-SF/ASHRAE2
119
       27/3/5/PEOPLE/255/255/2.24/WATT-SF/ASHRAE2
 120
       27/4/4/PEOPLE/255/255/.84/WATT-SF/ASHRAE2
121
       27/6/3/PEOPLE/345/435/.80/WATT-SF/ASHRAE2
122
       29/1/15/PCT-MCLG/0//612/CFM/612/CFM
123
       29/2/15/PCT-MCLG/0//907/CFM/907/CFM
124
       29/3/15/PCT-MCLG/0//67/CFM/67/CFM
125
       29/4/15/PCT-MCLG/0//358/CFM/358/CFM
126
       29/5/15/PCT-MCLG/0//128/CFM/128/CFM
127
       29/6/0/PCT-MCLG/0//850/CFM/850/CFM
128
       30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
129
       30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
130
       30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
131
       30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
132
       30/5/150/CFM/0/CFM///0/CFM/0/CFM
133
       30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
134
       31/1/1/1853/1//147/SINE-FIT/80/50
       SYSTEM - 2
135
       39/2/WALL & ROOF INSULATION
136
137
       40/1/SZ
       41/1/1/2
138
       42/1/1.5/0/1///.2
139
       44/1/DRY-BULB/65/15
140
141
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
       40/2/UH
142
143
       41/2/1/1/3/3
       42/2//.25////.25
144
       45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
145
146
       40/3/RAD
147
       41/3/2/2
148
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
149
       EQUIPMENT - 2
150
       59/2/CARLISLE///WALL & ROOF INSULATION
151
       60/1/1/BLKPLANT/1/1
       62/1/EQ1160S/1/25/TONS/87.9/KW
152
       65/1/1//2/3
153
154
       67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
       69/1/EQ4003/EQ4003
155
156
       69/2//E04003
       LOAD - 3
157
158
       19/3/REPLACE FLUORESCENT LAMPS
159
       20/1/1/BASEMENT/3927/1//0//10
160
       20/2/1/RECEIVING/951/1//2//14
161
       20/3/1/STORE/2067/1//2.75//14
       20/4/1/LOBBY/768/1//2.75//14
162
       20/5/2/BATH ROOMS/169/1//5.75//14
163
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
164
       21/M///CBADCTX///CBADHTX
165
166
       22/2/1/YES////11
      22/3/1/YES////11
167
168
      22/4/1/YES////11
169
      22/5/1/YES////11
170
      22/6/1/YES////146
171
       24/1/1/310/1//139/135
172
       24/1/2/107/1//139/225
173
      24/1/3/407/1//139/45
174
      24/2/1/660/1//140/135
```

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CONTENTS OF : E:\CB253.TM
LINE #
175
       24/2/2/275/1//140/225
176
       24/2/3/275/1//140/45
177
       24/3/1/275/1//140/45
178
       24/4/1/660/1//141/315
179
       24/4/2/220/1//140/45
       24/5/1/371/1//140/45
180
181
       24/6/1/1207/1//142/135
182
       24/6/2/1156/1//142/225
183
       24/6/3/1207/1//142/315
       25/2/1/5.25/3/5/1.04/.95
184
185
       25/2/2/5.25/3/2/1.04/.95
186
       25/4/1/5.5/5/10/1.04/.95
187
       25/5/1/3/1.5/4/1.04/.95
188
       26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
189
       26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
190
       27/1/6/PEOPLE/255/255/.97/WATT-SF/ASHRAE2
       27/2/2/PEOPLE/255/255/.91/WATT-SF/ASHRAE2
191
192
       27/3/5/PEOPLE/255/255/1.9/WATT-SF/ASHRAE2
193
       27/4/4/PEOPLE/255/255/.64/WATT-SF/ASHRAE2
194
       27/6/3/PEOPLE/345/435/.69/WATT-SF/ASHRAE2
195
       29/1/15/PCT-MCLG/0//612/CFM/612/CFM
196
       29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
197
       29/3/15/PCT-MCLG/0//85/CFM/85/CFM
198
      29/4/15/PCT-MCLG/0//469/CFM/469/CFM
199
      29/5/15/PCT-MCLG/0//170/CFM/170/CFM
200
      29/6/0/PCT-MCLG/0//850/CFM/850/CFM
201
      30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
202
      30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
203
      30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
204
      30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
205
      30/5/150/CFM/0/CFM///0/CFM/0/CFM
206
      30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
207
      31/1/1/1853/1//147/SINE-FIT/80/50
208
      SYSTEM - 3
      39/3/REPLACE FLUORESCENT LAMPS
209
210
      40/1/SZ
      41/1/1/2
211
212
      42/1/1.5/0/1///.2
213
      44/1/DRY-BULB/65/15
214
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
215
      40/2/UH
      41/2/1/1/3/3
216
217
      42/2//.25////.25
      45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
218
219
      40/3/RAD
220
      41/3/2/2
221
      45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
222
      EQUIPMENT - 3
      59/3/CARLISLE///REPLACE FLUORESCENT LAMPS
223
224
      60/1/1/BLKPLANT/1/1
      62/1/EQ1160S/1/25/TONS/87.9/KW
225
226
      65/1/1//2/3
227
      67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
228
      69/1/EQ4003/EQ4003
229
      69/2//EQ4003
230
      LOAD - 4
231
      19/4/REPLACE FLUORESCENT BALLASTS
232
      20/1/1/BASEMENT/3927/1//0//10
```

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CONTENTS OF : E:\CB253.TM
LINE #
 233
       20/2/1/RECEIVING/951/1//2//14
       20/3/1/STORE/2067/1//2.75//14
 234
 235
       20/4/1/LOBBY/768/1//2.75//14
 236
       20/5/2/BATH ROOMS/169/1//5.75//14
 237
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
 238
       21/M///CBADCTX///CBADHTX
239
       22/2/1/YES////11
240
       22/3/1/YES////11
       22/4/1/YES////11
241
242
       22/5/1/YES////11
243
       22/6/1/YES////146
244
       24/1/1/310/1//139/135
245
       24/1/2/107/1//139/225
246
       24/1/3/407/1//139/45
247
       24/2/1/660/1//140/135
248
       24/2/2/275/1//140/225
249
       24/2/3/275/1//140/45
250
       24/3/1/275/1//140/45
251
       24/4/1/660/1//141/315
252
       24/4/2/220/1//140/45
253
       24/5/1/371/1//140/45
254
       24/6/1/1207/1//142/135
       24/6/2/1156/1//142/225
255
256
       24/6/3/1207/1//142/315
257
       25/2/1/5.25/3/5/1.04/.95
258
       25/2/2/5.25/3/2/1.04/.95
259
       25/4/1/5.5/5/10/1.04/.95
260
       25/5/1/3/1.5/4/1.04/.95
       26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
261
       26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
262
       27/1/6/PEOPLE/255/255/.84/WATT-SF/ASHRAE2
263
264
       27/2/2/PEOPLE/255/255/.78/WATT-SF/ASHRAE2
       27/3/5/PEOPLE/255/255/1.7/WATT-SF/ASHRAE2
265
266
       27/4/4/PEOPLE/255/255/.55/WATT-SF/ASHRAE2
267
       27/6/3/PEOPLE/345/435/.60/WATT-SF/ASHRAE2
      29/1/15/PCT-MCLG/0//612/CFM/612/CFM
268
269
      29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
270
      29/3/15/PCT-MCLG/0//85/CFM/85/CFM
271
      29/4/15/PCT-MCLG/0//469/CFM/469/CFM
272
      29/5/15/PCT-MCLG/0//170/CFM/170/CFM
      29/6/0/PCT-MCLG/0//850/CFM/850/CFM
273
274
      30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
275
      30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
276
      30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
277
      30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
278
      30/5/150/CFM/0/CFM///0/CFM/0/CFM
279
      30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
280
      31/1/1/1853/1//147/SINE-FIT/80/50
281
      SYSTEM - 4
282
      39/4/REPLACE FLUORESCENT BALLASTS
283
      40/1/SZ
284
      41/1/1/2
285
      42/1/1.5/0/1///.2
286
      44/1/DRY-BULB/65/15
287
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
288
      40/2/UH
289
      41/2/1/1/3/3
290
      42/2//.25////.25
```

CONTENTS OF : E:\CB253.TM LINE # 45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF 291 292 40/3/RAD 293 41/3/2/2 294 45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF 295 EQUIPMENT - 4 59/4/CARLISLE///REPLACE FLUORESCENT BALLASTS 296 297 60/1/1/BLKPLANT/1/1 298 62/1/EQ1160S/1/25/TONS/87.9/KW 299 65/1/1//2/3 67/1/E02006/1/.33/HP/141.7/MBH/41.5/KW 300 69/1/EQ4003/EQ4003 301 69/2//EQ4003 302

```
CONTENTS OF : E:\CB253B.TM
LINE #
   1
       J08 - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 253
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
 12
       19/1/REPLACE FLUORESCENT FIXTURES
  13
       20/1/1/BASEMENT/3927/1//0//10
  14
       20/2/1/RECEIVING/951/1//2//14
  15
       20/3/1/STORE/2067/1//2.75//14
       20/4/1/LOBBY/768/1//2.75//14
 16
 17
       20/5/2/BATH ROOMS/169/1//5.75//14
 18
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
 19
       21/M///CBADCTX///CBADHTX
 20
       22/2/1/YES////11
       22/3/1/YES////11
  21
 22
       22/4/1/YES////11
 23
       22/5/1/YES////11
 24
       22/6/1/YES////146
 25
       24/1/1/310/1//139/135
 26
       24/1/2/107/1//139/225
 27
       24/1/3/407/1//139/45
 28
       24/2/1/660/1//140/135
 29
       24/2/2/275/1//140/225
 30
       24/2/3/275/1//140/45
 31
       24/3/1/275/1//140/45
 32
       24/4/1/660/1//141/315
 33
       24/4/2/220/1//140/45
 34
       24/5/1/371/1//140/45
 35
      24/6/1/1207/1//142/135
 36
      24/6/2/1156/1//142/225
 37
      24/6/3/1207/1//142/315
 38
      25/2/1/5.25/3/5/1.04/.95
 39
      25/2/2/5.25/3/2/1.04/.95
 40
      25/4/1/5.5/5/10/1.04/.95
      25/5/1/3/1.5/4/1.04/.95
 41
 42
      26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
 43
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
      27/1/6/PEOPLE/255/255/.70/WATT-SF/ASHRAE2
 44
      27/2/2/PEOPLE/255/255/.65/WATT-SF/ASHRAE2
 45
      27/3/5/PEOPLE/255/255/1.4/WATT-SF/ASHRAE2
 46
 47
      27/4/4/PEOPLE/255/255/.46/WATT-SF/ASHRAE2
      27/6/3/PEOPLE/345/435/.50/WATT-SF/ASHRAE2
 48
      29/1/15/PCT-MCLG/0//612/CFM/612/CFM
 49
      29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
 50
      29/3/15/PCT-MCLG/0//85/CFM/85/CFM
 51
      29/4/15/PCT-MCLG/0//469/CFM/469/CFM
 52
 53
      29/5/15/PCT-MCLG/0//170/CFM/170/CFM
 54
      29/6/0/PCT-MCLG/0//850/CFM/850/CFM
 55
      30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
      30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
 56
      30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
 57
 58
      30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
```

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CONTENTS OF : E:\CB253B.TM
LINE #
  59
       30/5/150/CFM/0/CFM///0/CFM/0/CFM
  60
       30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
  61
       31/1/1/1853/1//147/SINE-FIT/80/50
  62
       SYSTEM - 1
  63
       39/1/REPLACE FLUORESCENT FIXTURES
  64
       40/1/SZ
  65
       41/1/1/2
  66
       42/1/1.5/0/1///.2
  67
       44/1/DRY-BULB/65/15
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
  68
  69
       40/2/UH
 70
       41/2/1/1/3/3
 71
       42/2//.25////.25
 72
       45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 73
       40/3/RAD
 74
       41/3/2/2
       45/3/0FF/0FF/0FF/0FF/CBADHTG/0FF/0FF/0FF/0FF
 75
 76
       EQUIPMENT - 1
 77
       59/1/CARLISLE///REPLACE FLUORESCENT FIXTURES
 78
       60/1/1/BLKPLANT/1/1
 79
       62/1/EQ1160S/1/25/TONS/87.9/KW
 80
      65/1/1//2/3
      67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
 81
 82
      69/1/EQ4003/EQ4003
 83
      69/2//E04003
 84
      LOAD - 2
 85
      19/2/INFRARED HEATERS
 86
      20/1/1/BASEMENT/3927/1//0//10
      20/2/1/RECEIVING/951/1//2//14
 87
      20/3/1/STORE/2067/1//2.75//14
 88
 89
      20/4/1/LOBBY/768/1//2.75//14
 90
      20/5/2/BATH ROOMS/169/1//5.75//14
      20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
 91
      21/M///CBADCTX///CBADHTX
 92
 93
      21/6//////IR55
 94
      22/2/1/YES////11
 95
      22/3/1/YES////11
 96
      22/4/1/YES////11
      22/5/1/YES////11
 97
 98
      22/6/1/YES////146
 99
      24/1/1/310/1//139/135
100
      24/1/2/107/1//139/225
101
      24/1/3/407/1//139/45
      24/2/1/660/1//140/135
102
103
      24/2/2/275/1//140/225
104
      24/2/3/275/1//140/45
105
      24/3/1/275/1//140/45
106
      24/4/1/660/1//141/315
107
      24/4/2/220/1//140/45
108
      24/5/1/371/1//140/45
      24/6/1/1207/1//142/135
109
110
      24/6/2/1156/1//142/225
111
      24/6/3/1207/1//142/315
112
      25/2/1/5.25/3/5/1.04/.95
113
      25/2/2/5.25/3/2/1.04/.95
114
      25/4/1/5.5/5/10/1.04/.95
115
      25/5/1/3/1.5/4/1.04/.95
116
      26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
```

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CONTENTS OF : E:\CB253B.TM
LINE #
       26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
 117
 118
       27/1/6/PEOPLE/255/255/1.14/WATT-SF/ASHRAE2
       27/2/2/PEOPLE/255/255/1.09/WATT-SF/ASHRAE2
 119
 120
       27/3/5/PEOPLE/255/255/2.24/WATT-SF/ASHRAE2
       27/4/4/PEOPLE/255/255/.84/WATT-SF/ASHRAE2
 121
 122
       27/6/3/PEOPLE/345/435/.80/WATT-SF/ASHRAE2
       29/1/15/PCT-MCLG/0//612/CFM/612/CFM
 123
 124
       29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
       29/3/15/PCT-MCLG/0//85/CFM/85/CFM
 125
 126
       29/4/15/PCT-MCLG/0//469/CFM/469/CFM
 127
       29/5/15/PCT-MCLG/0//170/CFM/170/CFM
       29/6/0/PCT-MCLG/0//676/CFM/676/CFM
 128
       30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
 129
       30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
 130
 131
       30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
       30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
 132
 133
       30/5/150/CFM/0/CFM///0/CFM/0/CFM
       30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
 134
       31/1/1/1853/1//147/SINE-FIT/80/50
 135
 136
       SYSTEM - 2
       39/2/INFRERED HEATERS
 137
       40/1/SZ
 138
 139
       41/1/1/2
       42/1/1.5/0/1///.2
 140
       44/1/DRY-BULB/65/15
 141
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 142
 143
       40/2/UH
 144
       41/2/1/1/3/3
       42/2//.25////.25
 145
       45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 146
 147
       40/3/RAD
 148
       41/3/2/2
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 149
       EQUIPMENT - 2
 150
       59/2/CARLISLE///INRARED HEATERS
 151
       60/1/1/BLKPLANT/1/1
 152
 153
       62/1/EQ1160S/1/25/TONS/87.9/KW
       65/1/1//2/3
 154
       67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
 155
 156
       69/1/EQ4003/EQ4003
 157
       69/2//EQ4003
       LOAD - 3
 158
       19/3/COMBINED ECOS
 159
       20/1/1/BASEMENT/3927/1//0//10
 160
       20/2/1/RECEIVING/951/1//2//14
 161
 162
       20/3/1/STORE/2067/1//2.75//14
       20/4/1/LOBBY/768/1//2.75//14
 163
       20/5/2/BATH ROOMS/169/1//5.75//14
 164
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
 165
       21/M///CBADCTX///CBADHTX
 166
 167
       21/6//////IR55
       22/2/1/YES////180
 168
       22/3/1/YES////180
 169
       22/4/1/YES////180
 170
       22/5/1/YES////180
 171
       22/6/1/YES////146
 172
 173
       24/1/1/310/1//139/135
 174
       24/1/2/107/1//139/225
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CONTENTS OF : E:\CB253B.TM
LINE #
175
       24/1/3/407/1//139/45
176
       24/2/1/660/1//181/135
177
       24/2/2/275/1//181/225
178
       24/2/3/275/1//181/45
179
       24/3/1/275/1//181/45
180
       24/4/1/660/1//181/315
       24/4/2/220/1//181/45
181
182
       24/5/1/371/1//181/45
183
       24/6/1/1207/1//142/135
184
       24/6/2/1156/1//142/225
       24/6/3/1207/1//142/315
185
186
       25/2/1/5.25/3/5/1.04/.95
187
       25/2/2/5.25/3/2/1.04/.95
188
       25/4/1/5.5/5/10/1.04/.95
189
       25/5/1/3/1.5/4/1.04/.95
190
       26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
191
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
      27/1/6/PEOPLE/255/255/.70/WATT-SF/ASHRAE2
192
193
       27/2/2/PEOPLE/255/255/.65/WATT-SF/ASHRAE2
194
       27/3/5/PEOPLE/255/255/1.4/WATT-SF/ASHRAE2
195
       27/4/4/PEOPLE/255/255/.46/WATT-SF/ASHRAE2
196
       27/6/3/PEOPLE/345/435/.50/WATT-SF/ASHRAE2
197
       29/1/15/PCT-MCLG/0//612/CFM/612/CFM
198
      29/2/15/PCT-MCLG/0//907/CFM/907/CFM
199
       29/3/15/PCT-MCLG/0//67/CFM/67/CFM
200
      29/4/15/PCT-MCLG/0//358/CFM/358/CFM
201
      29/5/15/PCT-MCLG/0//128/CFM/128/CFM
202
      29/6/0/PCT-MCLG/0//676/CFM/676/CFM
203
      30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
204
      30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
      30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
205
206
      30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
207
      30/5/150/CFM/0/CFM///0/CFM/0/CFM
      30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
208
209
      31/1/1/1853/1//147/SINE-FIT/80/50
210
      SYSTEM - 3
211
      39/3/COMBINED ECOS
      40/1/SZ
212
      41/1/1/2
213
214
      42/1/1.5/0/1///.2
      44/1/DRY-BULB/65/15
215
216
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
      40/2/UH
217
218
      41/2/1/1/3/3
219
      42/2//.25////.25
220
      45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
221
      40/3/RAD
      41/3/2/2
222
      45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
223
      EQUIPMENT - 3
224
      59/3/CARLISLE///COMBINED ECOS
225
226
      60/1/1/BLKPLANT/1/1
227
      62/1/EQ1160S/1/25/TONS/87.9/KW
228
      65/1/1//2/3
229
      67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
230
      69/1/EQ4003/EQ4003
      69/2//EQ4003
231
```

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CONTENTS OF : C:\JOBS\CB253C.TM
     J08 - 1
 2
     01/ENERGY SAVINGS OPPORTUNITY STUDY
     01/CARLISLE BARRACKS, PA
     01/DEPARTMENT OF THE ARMY
     01/BENATEC ASSOCIATES
     01/BUILDING 253
     08/CARLISLE
     09/MAY/SEP////APR/OCT
 9
     10/CLTD-CLF
     11///ZONE
10
41
     LOAD - 1
12
     19/1/BASE BUILDING
13
     20/1/1/BASEMENT/3927/1//0//10
     20/2/1/RECEIVING/951/1//2//14
14
     20/3/1/STORE/2067/1//2.75//14
15
16
     20/4/1/L08BY/768/1//2.75//14
17
     20/5/2/BATH ROOMS/169/1//5.75//14
     20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
19
     21/M///CBADCTX///CBADHTX
20
     21/6///CBADSCTX///CBADSHTX
21
     22/2/1/YES////11
     22/3/1/YES////11
23
     22/4/1/YES////11
     22/5/1/YES////11
25
     22/6/1/YES///.08/146
     24/1/1/310/1//139/135
27
     24/1/2/107/1//139/225
28
     24/1/3/407/1//139/45
29
     24/2/1/660/1//140/135
     24/2/2/275/1//140/225
31
     24/2/3/275/1//140/45
     24/3/1/275/1//140/45
32
33
     24/4/1/660/1//141/315
     24/4/2/220/1//140/45
35
     24/5/1/371/1//140/45
36
     24/6/1/1207/1//142/135
37
     24/6/2/1156/1//142/225
38
     24/6/3/1207/1//142/315
     25/2/1/5.25/3/5/1.04/.95
40
     25/2/2/5.25/3/2/1.04/.95
     25/4/1/5.5/5/10/1.04/.95
41
42
     25/5/1/3/1.5/4/1.04/.95
     26/M/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/CBADP&L/OFF
    26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
44
     27/1/6/PEOPLE/255/255/1.14/WATT-SF/ASHRAE2
45
    27/2/2/PEOPLE/255/255/1.09/WATT-SF/ASHRAE2
     27/3/5/PEOPLE/255/255/2.24/WATT-SF/ASHRAE2
47
48
    27/4/4/PEOPLE/255/255/.84/WATT-SF/ASHRAE2
     27/6/3/PEOPLE/345/435/.80/WATT-SF/ASHRAE2
49
     29/1/15/PCT-MCLG/0//612/CFM/612/CFM
51
     29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
52
     29/3/15/PCT-MCLG/0//85/CFM/85/CFM
53
    29/4/15/PCT-MCLG/0//469/CFM/469/CFM
54
     29/5/15/PCT-MCLG/0//170/CFM/170/CFM
    29/6/0/PCT-MCLG/0//850/CFM/850/CFM
55
56
     30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
57
     30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
```

30/3/2850/CFM/0/CFM///2400/CFM/200/CFM

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CONTENTS OF : C:\JOBS\CB253C.TM
LINE #
  59
       30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
       30/5/150/CFM/0/CFM///0/CFM/0/CFM
  60
       30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
       31/1/1/1853/1//147/SINE-FIT/80/50
  62
  63
       SYSTEM - 1.
  64
       39/1/AIR STRATIFICATION
  65
       40/1/52
       41/1/1/2
  66
       42/1/1.5/0/1///.2
  67
  68
       44/1/DRY-BULB/65/15
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
  69
  70
       40/2/UH
  71
       41/2/1/1/3/3
  72
       42/2//.25////.25
       45/2/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 73
 74
       40/3/RAD
 75
       41/3/2/2
       45/3/OFF/OFF/OFF/OFF/OFF/CBACHTG/OFF/OFF/OFF/OFF
  76
 77
       EQUIPMENT - 1
       .59/1/CARLISLE///AIR STRATIFICATION
 78
       60/1/1/8LKPLANT/1/1
 79
  80
       62/1/EQ1160S/1/25/TONS/87.9/KW
 81
       65/1/1//2/3
 82
       67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
 83
       69/1/EQ4003/EQ4003
       69/2//EQ4003
 84
      LOAD - 2
  85
 86
       19/1/BASE BUILDING
 87
       20/1/1/BASEMENT/3927/1//0//10
       20/2/1/RECEIVING/951/1//2//14
       20/3/1/STORE/2067/1//2.75//14
 89
       20/4/1/LOBBY/768/1//2.75//14
 91
       20/5/2/BATH ROOMS/169/1//5.75//14
  92
       20/6/3/MED. WAREHOUSE/4828/1/4/0//17.3
 93
       21/H///CBADCTX///CBADHTX
      22/2/1/YES////11
 94
 95
       22/3/1/YES////11
 96
       22/4/1/YES////11
 97
       22/5/1/YES////11
 98
       22/6/1/YES////146
 99
      24/1/1/310/1//139/135
       24/1/2/107/1//139/225
 100
      24/1/3/407/1//139/45
101
       24/2/1/660/1//140/135
102
      24/2/2/275/1//140/225
103
      24/2/3/275/1//140/45
104
      24/3/1/275/1//140/45
105
106
      24/4/1/660/1//141/315
      24/4/2/220/1//140/45
107
108
      24/5/1/371/1//140/45
109
      24/6/1/1207/1//142/135
       24/6/2/1156/1//142/225
110
111
      24/6/3/1207/1//142/315
112
      25/2/1/5.25/3/5/1.04/.95
      25/2/2/5.25/3/2/1.04/.95
113
114
      25/4/1/5.5/5/10/1.04/.95
115
      25/5/1/3/1.5/4/1.04/.95
116
       26/M/CBADP&L/CBADP&L/CBADP&L//DFF/CBADCLG/CBADHTG/DFF/CBADP&L/OFF
```

```
LINE #
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/CBADP&L/OFF
117
      27/1/6/PEOPLE/255/255/1.14/WATT-SF/ASHRAE2
118
119
      27/2/2/PEOPLE/255/255/1.09/WATT-SF/ASHRAE2
120
      27/3/5/PEOPLE/255/255/2.24/WATT-SF/ASHRAE2
121
      27/4/4/PEOPLE/255/255/.84/WATT-SF/ASHRAE2
- 122
      27/6/3/PEOPLE/345/435/.80/WATT-SF/ASHRAE2
123
      28/6/1/CEILING FANS/384/WATTS/CBADP&L/ELEC
124
      29/1/15/PCT-MCLG/0//612/CFM/612/CFM
125
      29/2/15/PCT-MCLG/0//1193/CFM/1193/CFM
126
      29/3/15/PCT-MCLG/0//85/CFM/85/CFM
127
      29/4/15/PCT-MCLG/0//469/CFM/469/CFM
128
      29/5/15/PCT-MCEG/0//170/CFM/170/CFM
129
      29/6/0/PCT-MCLG/0//850/CFM/850/CFM
      30/1/4315/CFM/0/CFM///1500/CFM/635/CFM
.130
131
      30/2/1200/CFM/0/CFM///3300/CFM/200/CFM
132
      30/3/2850/CFM/0/CFM///2400/CFM/200/CFM
133
      30/4/1800/CFM/0/CFM///4400/CFM/200/CFM
134
      30/5/150/CFM/0/CFM///0/CFM/0/CFM
135
      30/6/0/CFM/2525/CFM///0/CFM/23520/CFM
136
      31/1/1/1853/1//147/SINE-FIT/80/50
      SYSTEM - 2
137
138
      39/2/CEILING FANS
      40/1/SZ
139
140
      41/1/1/2
141
      42/1/1.5/0/1///.2
142
      44/1/DRY-BULB/65/15
143
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
144
      40/2/UH
145
      41/2/1/1/3/3
146
      42/2//.25////.25
147
      45/2/OFF/OFF/OFF/OFF/CBADHTG/OFF/GFF/GFF/OFF
148
      40/3/RAD
149
      41/3/2/2
      45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
150
151
      EQUIPMENT - 2
      59/2/CARLISLE///CEILING FANS
152
153
      60/1/1/BLKPLANT/1/1
      62/1/EQ1160S/1/25/TONS/87.9/KW
154
155
      65/1/1//2/3
    > 67/1/EQ2006/1/.33/HP/141.7/MBH/41.5/KW
156
157
      69/1/EQ4003/EQ4003
158
      69/2//EQ4003
```

Building 253
Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May
System Simulation Period: January
To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:37:42 1/19/94

Dataset Name: CB253 .TM

-805,408

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

0.0

0.0

SYSTEM SUMMARY (Design Airflow Quantities)

	*****		Auxil.	Room			
System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 SZ	1,547	10,315	4,331	12,844	1,547	0	1,035
2 UH	0	0	7,035	0	3,209	0	0
3 RAD	0	. 0	0	0	170	0	0
Totals	1,547	10,315	11,366	12,844	4,926	0	1,035

CAPACITY - ALTERNATIVE 1
BASE BUILDING

------ S Y S T E M S U M M A R Y ------ (Design Capacity Quantities)

------ Cooling ------- Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Reheat Humidif. Opt. Vent Preheat Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 22.7 0.0 0.0 22.7 -400,260 0 -247.741 -400,260 0.0 -386,318 0 0 -386,318 2 UH 0.0 0.0 0.0 0 3 RAD 0.0 0.0 0.0 0.0 -18,830 0 0 -18,830

0

-247,741

The building peaked at hour 14 month 7 with a capacity of 21.3 tons

22.7 -805,408

- ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

Totals

22.7

			Percent		Cool:	ing	Heat	-		
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	SZ	15.00	1.31	454.6	347.4	34.54	0.55	-50.78	7,882
.2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.56	-30.80	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-111.42	169

System 1 Peak SI - SINGLE ZONE

Peaked a	t Time =	:=>	Mo/Hr:	7/14			*	Mo/	Hr:	7/16		Mo/Hr: 1	3/1	
Outside	Air ==>	0A	DB/WB/HR:	7/14 91/ 74/105.	0		*	0A	DB:	91 *		OAD8:	•	
		Space	Pat Air	Ret. Air	Not		*	Sn	1200	* * Percnt		ak Coil	Deak	Percni
		Sens.+Lat.		Latent	Total	Of Int	*	Sensi			Space Se			
Envelone	Inads	(Rtuh)		(Btuh)	(Rtuh)	(%)	*	(Rt		(%) *				
Skylit	e Solt	(000.1)	(5541)	(Btuh)	0			(50	0	0.00 *	(000)	0	0	0.0
Skylit	e Cond	0	0	<u>'</u>	0				٥	0 00 #	:	0	٥	0.00
Roof C	and .	0	52 876		52,876				0	0.00 * 0.00 * 0.00 * 21.86 * 3.84 *		0 -30	241	10.3
Glass	Solar	21.378	02,5.0	)	21,378	7.85	*	29.	188	21.86 *		0	,	0.0
Glass	Cond	21,378 5,608	. 0	` , <b>\</b>	5,608			5.	130	3.84 *	-28.0	15 -28	.015	9.5
Wall C	nod	19,751	2 412		22,162			21,	311	15 96 *	-48,2	96 -53	384	18 2
Partit		1,333			1,333			1,		1.00 *	-4,7	77 -4	797	1 6
	4	^			^	Δ ΔΔ			0	0.00 *	7,1	0	, , ,	0.0
	ration	77 699		ı	77,699	28 54	*	42		31.49 *		34 -176		
	tal==>	125 768	55 288	1	181 056	66 50	*	99		74.16 *		11 -292		
Internal	Inads	123,700	JJ, 200		101,000	00.30	*	,,,	010	74.10 *			,011	****
Lights	20043	28 943	0	1	28 943			27	921	20 91 *		0	0	0.00
		28,943 7,913 0	v		7,913			7	088	2 31 *		0	Ö	0.00
People Misc		7,710	0	0		0.00		υ,	000	2.31 *		0	0	0.00
Sub To	talii	0 36,856 9,390 0	0	0	36,856			31	009	23.23 *		0	Ö	0.00
Ceiling	Load	9.390	-9 390	1	0				981	4.48 *	-11 39		Ö	0.00
Outside	Air	0	0,070	0	45,625			3,	0	0.00 *	11,0		Ö	0.00
Sup. Fan	Heat	·	v	v		4.04			٠	0.00 *		•	0	0.00
Ret. Fan			7,237		7,237					0.00 *			Ö	0.00
Duct Hea			0			0.00				0.00 *			0	0.00
		-2,489	0		-2 489				489			0	Ö	0.00
Exhaust		2,107	-7.027		-7,027			-,	107	0.00 *		•	0	0.00
Terminal			0	0	0	0.00				0.00 *			0	0.00
101	0,5000		•	•	•	0.00	*			*			•	
Grand To	tal==>	169,525	46,107	. 0	272,260	100.00	*	133,	510	100.00 *	-268,63	39 -292	,571	100.00
			000	LING COIL SE	ELECTION							ARFAS-		
										DB/WB/HR	Gross Tota	l Gla	ss (st	
										F Grains		7,882	•	, , ,
ain Clg										5 78.5	Part	1,853	•	
ux Clg	0.0		0.0	0			0.0	0.0	0.0		ExFlr	0		
pt Vent	0.0		0.0	0	0.0	.0 0	0.0	0.0	0.6		Roof	3,955		0 (
otals	22.7										Wall	3,560	4	403 11
	HEATI	NG COIL SEL	ECTION		AIR	FLOWS (c	fm)			-ENGINEERING	CHECKS	TEMPER	ATURES	S (F)
· ·	Capaci	ty Coil A	irfl Ent			Cooling		Heating		lg % OA	15.0	Type	Clg	
	(Mbh	) (cf	m) Deg F	Deg F	Vent	1,547		0	C	lg Cfm/Sqft	1.31	SAD8	_	1 125.0
ain Htg	-400				Infil	2,529		2,529		lg Cfm/Ton		Plenum	82.5	
ux Htg	0	.0			Supply	10,315		4,331		lg Sqft/Ton		Return	79.8	
reheat	-247				Mincfm	. 0		0		lg Btuh/Saft		Ret/OA	81.4	
eheat		.0	0 0.0		Return	10,177		4,331		o. People	17	Runarnd	75.0	
umidif		.0	0 0.0		Exhaust	1,409		0			0.0	Fn MtrTD	0.2	
pt Vent		.0	0 0.0		Rm Exh	1,035		. 0		tg Cfm/SqFt		Fn 81dTD	0.2	
otal	-400				Auxil	0		. 0		tg Btuh/SqFt		Fn Frict		

System 2 Block UH - UNIT HEATERS

******	******	*****	יחחו זאכ רחזו	OFAV ****	*****	******	****	*** CIC 9	RDACE	DFAX ****	*****	מדדות כת:	TI DEAK	******
	t Time ==>		Mo/Hr:		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		*		ir: 0				: 13/ 1	
		ΠΔ	DB/WB/HR:	•	٥		*	040		0 *		OADB		
0003100	n11/	VII.	יאווי, וטעו	0, 0, 0,	•		*	0110		*		01100	. ,	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Spa	ice	Percnt *	Space Pa	ak Co	il Peak	Percnt
	Sen	s.+Lat.	Sensible			Of Tot		Sensib		Of Tot *	•		ot Sens	Of Tot
Envelope		(Btuh)	(8tuh)		(Btuh)			(Btu		(%) *	•		(Btuh)	(\$)
Skylit		0	0		0			(55)	0	0.00 *		0	0	0.00
Skylit		0	0		0				0	0.00 *		0	0	0.00
Roof C		0	0		0				0	0.00 *		35	-53,053	13.73
Glass		0	0	•	0				0	0.00 *			0	0.00
Glass		0	0		0				0	0.00 *		64		6.93
Wall C		0	0		0				0	0.00 *		257		
Partit		0	-		0				0	0.00 *	-		-4,797	
	d Floor	0			0				ō	0.00 *			0	
Infilt		n			0				0	0.00 *			223,493	
Sub To		0	0		0				0	0.00 *			386,318	
Internal		V	V		V	V.VV	*		٧	*	030,0	,,,	, 010	100.00
Lights		0	0		٨	0.00			0	0.00 *		0	٥	0.00
People		0	V		0				0	0.00 *		ō	0	0.00
Misc		0	0	0	0				0	0.00 *		0	0	0.00
Sub To	tal1	0	0		'n	0.00			Ö	0.00 *		0	0	0.00
Ceiling		٥	0	-	0	0.00			0	0.00 *		•	0	0.00
Outside (		0	0		n	0.00			0	0.00 *		0	0	0.00
Sup. Fan		V	v	V	0				v	0.00 *		V	0	0.00
Ret. Fan			0		0	0.00				0.00 *			٥	0.00
Duct Hea			0		- 0					0.00 *			0	0.00
DUCT HEA DV/UNDR (	•	0	V		0	0.00			0	0.00 *		0	0	0.00
Exhaust	_	v	0	0	0				V	0.00 *		v	0	0.00
Terminal			0		Ŏ					0.00 *			٨	0.00
161 milliai	uypass		V	V	V	0.00	*			*			v	0.00
Grand To	tal==>	0	0	0	0	0.00	•		0	0.00 *		13 -	386,318	100.00
			000	ITHE COTE C	ELECTION			,				405		
			Sens Cap.								Gross Tot		lass (s	
	(Tons)		(Mbh)		Deg F De					Grains	Floor			., (•,
ain Clo					0.0								•	
ux Clg	0.0	0.0	0.0	0			).0	0.0	0.0	0.0	ExFlr	0		
pt Vent	0.0	0.0	0.0	ō			0.0	0.0	0.0	0.0	Roof	8,614		0 0
otals	0.0	0.0	•••	·	,			***	***	• • • • • • • • • • • • • • • • • • • •	Wall	6,759		385 6
	UEATING	COTI SEL	ECTION		AI	DEINWS (C	· f m ) _		r	NGINEERING	CHECKS	TEM(	COATHOC	s (F)
	Capacity	Coil A		Lvg	Туре	Cooling		eating		\$ OA	0.0	Тура		
	(Mbh)			Deg F	Vent		11	0		Cfm/Sqft	0.00	SAD8		0 119.2
ain Htg	-386.3		035 68.8	_	Infil	0		3,209		Cfm/Ton	0.00	Plenu		
	0.0		0 0.0	0.0	Supply	0		7,035		Sqft/Ton	0.00	Retur		
ux Htg			0 0.0	0.0	Mincfm				-					
reheat	0.0					0		7 075	-	Btuh/Sqft		Ret/Of		
eheat	0.0		0 0.0	0.0	Return	0		7,035		People	0	Runari		
umidif	0.0		0.0	0.0	Exhaust	0		0	_	% 0A	0.0	Fn Mti		
pt Vent	0.0		0 0.0	0.0	Rm Exh	0		. 0	_	Cfm/SqFt	0.56	Fn Blo		
otal	-386.3				Auxil	0		0	Htg	Btuh/SqFt	-30.80	Fn Fri	ict 0.	0 0.1

System 3 Block RAD - RADIATION

****			.001 THO COT	6545 4444				**** 010 01	DAAC (		******	THE COTE O	PAV 4	
	t Time ==		Mo/Hr:		*****	*****	****		r: 0/		****** HEAT	Mo/Hr: 13		******
				0/ 0/ 0.	۸		*	OADE	-	) *		0AD8:	*	
0012106	HII/	UH	אווןטוויןטווי.	0/ 0/ 0.	·V		*	UHD	0. (	, + *		UHUB.	4	
		Space	Ret Air	r Ret. Air	Net	Percnt	*	Spac	CP	Percnt *	Space Pea	k Coil P	aak	Percnt
	S	ens.+Lat.	Sensible		Total			Sensibl		Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)			(%)		(Btul		(%) *	•			(\$)
Skylit		0	(0.011)		(50011)	0.00		(000)	0	0.00 *		0	0	0.00
Skylit		0	Č	, }	n	0.00			0	0.00 *		0	0	0.00
Roof C		0	,	, )	0	0.00			0	0.00 *		0 -	-	4.90
Glass		0			0				0	0.00 *			0	0.00
Glass		0		-	0	0.00			0	0.00 *		0 -1,	_	6.64
Wall C		0	ì		0	0.00			0	0.00 *				25.58
Partit		0	`	,	0	0.00			0	0.00 *			-	0.00
	d Floor	n			0	0.00			0	0.00 *		0	0	0.00
Infilt		٥			0	0.00			0	0.00 *		0 -11,		
Sub To		0	(	١	0	0.00			0	0.00 *		2 -18,		100.00
Internal		V	,	,	V	0.00	*		V	*		2 10,	000	100.00
Lights	Luavs	0	(	1	0	0.00			0	0.00 *		0	۸	0.00
People		0	,	1	0	0.00			0	0.00 *		n .	ň	0.00
Misc		0	(	) 0	0	0.00			0	0.00 *		0	0	0.00
Sub Tot	tol\	0	(		0	0.00			0	0.00 *		0	٨	0.00
Ceiling		0	(	_	0	0.00			0	0.00 *		•	٨	0.00
Outside 4		0	(		0	0.00			ō	0.00 *		0	٨	0.00
Sup. Fan		V	`	V	0	0.00		•	v	0.00 *		v	٨	0.00
Ret. Fan			0	١	0	0.00		•		0.00 *			٥	0.00
Duct Hear			(		0	0.00				0.00 *			٨	0.00
OV/UNDR S		0	•	′	0	0.00			0	0.00 *		0	٥	0.00
Exhaust I	-	V	C	) 0	0	0.00			V	0.00 *		V	n	0.00
Terminal			0		0	0.00				0.00 *			0	0.00
TOTHILITAL	oypass		•	V	v	0.00	*			*			V	V.VV
Grand To	tal==>	0	C	. 0	. 0	0.00			0	0.00 *		0 -18,	B30	100.00
•														
	T-+-1	0	000	LING COIL S	ELECTION	- DD /ND	/un			No /No	O T-4-			
				Coil Airfl							Gross Tota		5 (51	(\$)
Mada 01 a	(Tons)			(cfm)				Deg F De			Floor	169		
_					0.0									
Aux Clg Opt Vent	0.0	0.0	0.0	0			0.0 0.0		0.0	0.0	ExFlr	0		
Totals	0.0 0.0	0.0 0.0	0.0	U	0,0	).0 (	J. V	0.0	0.0	0.0	Roof Wall	169 371		0 0 18 5
106015	0.0	٧.٧									Wall	3/1		10 5
	HEATIN	G COIL SEL	ECTION		AIR	FLOWS (	cfm)		EN	GINEERING	CHECKS	TEMPERA	TURES	(F)
4	Capacity	y Coil A	irfl Ent	Lvg	Type	Cooling	1	Heating	Clg	% OA	0.0	Type	Clg	Htg
	(Mbh)	cf (cf	m) Deg F	Deg F	Vent	0		0	Clg	Cfm/Sqft	0.00	SADB	0.0	_
Main Htg	-18.8		0.0	_	Infil	0		170	-	Cfm/Ton	0.00	Plenum	0.0	
Aux Htg	0.0		0.0		Supply	. 0		. 0		Sqft/Ton	0.00	Return	0.0	
Preheat	0.0		0 0.0	0.0	Mincfm	0		0		Btuh/Sqft		Ret/OA	0.0	
Reheat	0.6		0.0	0.0	Return	0		0		People	0	Runarnd	0.0	
Humidif	0.0	0	0 0.0	0.0	Exhaust	0		0		% DA	0.0	Fn MtrTD	0.0	
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0		. 0		Cfm/SqFt	0.00	Fn BldTD	0.0	
Total	-18.8	В			Auxil	0		0	Htg	Btuh/SqFt	-111.42	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

					Room Mass	Room Capac.						
Room				Summr	Wintr	/hr/sqf	Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	₩indo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
- 3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.137	1.040	1.086	0.200	0.317	93.8	20.92
· 5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Buildin	•	0.144	0.000	0.000	0.000	0.162	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Sk1 /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
. 3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	. 0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	<pre>2 Total/Ave.</pre>				169	0	0	0	0	169	18	5	353
System	<ol> <li>Total/Ave.</li> </ol>				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	. 0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	0	0	0	0	4,828	0	0	3,570
System	<pre>2 Total/Ave.</pre>				12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				169	0	0	0	0	169	18	5	353
Buildin	g				20,592	3,706	0	0	0	12,738	807	8	9,883

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 - BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.162 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.221 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.27 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 16.56 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

## System Totals

Percent	Coo	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity		Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(\$)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	1.1	4	. 19	-52,657	41	1,104	867.5	0	0	0.0	0	0
5 - 10	2.3	4	18	-105,315	16	424	1,735.0	0	0	0.0	0	0
10 - 15	3.4	4	19	-157,972	13	341	2,602.5	0	0	0.0	0	0
15 - 20	4.5	4	22	-210,630	1	37	3,470.0	0	0	0.0	0	0
20 - 25	5.7	1	4	-263,287	1	33	4,337.5	9	571	0.0	0	0
25 - 30	6.8	11	56	-315,945	1	35	5,204.9	0	0	0.0	0	0
30 - 35	7.9	1	4	-368,602	0	8	6,072.4	0	0	0.0	0	0
35 - 40	9.1	8	41	-421,260	27	735	6,939.9	0	0	0.0	0	0
40 - 45	10.2	12	61	-473,917	0	0	7,807.4	83	5,088	0.0	0	0
45 - 50	11.3	14	68	-526,574	0	0	8,674.9	0	0	0.0	0	0
50 - 55	12.5	1	5	-579,232	0	0	9,542.4	0	0	0.0	0	0
55 - 60	13.6	4	19	-631,889	0	0	10,409.9	5	295	0.0	0	0
60 - 65	14.7	11	53	-684,547	0	0	11,277.4	. 3	204	0.0	0	0
65 - 70	15.9	12	60	-737,204	0	0	12,144.9	0	0	0.0	0	0
70 - 75	17.0	0	0	-789,862	0	0	13,012.4	0	0	0.0	0	0
75 - 80	18.2	4	20	-842,519	0	0	13,879.9	0	0	0.0	0	0
80 - 85	19.3	4	20	-895,177	0	0	14,747.4	0	0	0.0	0	0
85 - 90	20.4	2	10	-947,834	0	0	15,614.8	0	0	0.0	0	0
90 - 95	21.6	0	0	-1,000,492	0	0	16,482.3	0	0	0.0	0	0
95 - 100	22.7	0	0	-1,053,149	0	0	17,349.8	0	0	0.0	0	- 0
Hours Off	0.0	0	8.261	0	0	6.043	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

------ BUILDING TEMPERATURE PROFILES ------ BUILDING TEMPERATURE -----Zone Number ------Temperature Range 2 1 3 2 1 (F) Max. Temp. 82.8 82.8 96.1 93.9 89.7 Mo./Hr. 7 22 7 20 8 22 8 19 8 21 Day Type ..... Number of Hours ......... 0 Above 100 0 0 0 95 - 100 270 0 0 90 - 95 0 1,498 1,320 0 85 - 90 0 0 999 833 1,292 80 - 85 355 301 173 775 1,044 75 - 80 2,322 1,955 550 524 848 70 - 75 903 1,049 602 648 488 65 - 70 536 367 1,997 2,022 1,685 60 - 65 300 119 1,451 1,533 1,147 55 - 60 1,194 641 552 509 986 50 - 55 832 637 668 596 1,270 Below 50 2,513 3,496 Min. Temp. 35.1 29.9 54.9 54.9 54.9 Mo./Hr. 2 8 2 10 1 3 1 6 2 4 Day Type 5 5 5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

	ELEC	DEMAND		
	Off Peak	On Peak	OIL	₩ATER
Month	(kWh)	(kW)	(Therm)	(1000 Gl)
Jan	5,633	27	747	0
Feb	5,095	27	691	0
March	5,953	27	562	0
April	4,883	27	198	0
Máy	5,733	28	0	0
June	11,752	97	0	0
July	16,987	110	0	0
Aug	12,060	96	0	0
Sept	5,212	81	0	0
Oct	5,349	27	100	0
Nov	5,069	27	371	0
Dec	5,345	27	644	0
Total	89,071	110	3,312	2

Building Energy Consumption = 30,846 (Btu/Sq Ft/Year)
Source Energy Consumption = 61,223 (Btu/Sq Ft/Year)

Floor Area =

20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION ------

	Equip -							sumption							
um	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total	
0	LIGHTS					7404		1.000						***	
	ELEC PK	4888 25.4	4423 <b>25.</b> 4	5354 25.4	4655 <b>25.</b> 4	5121 25.4	5121 25.4	4655 25.4	5354 <b>25.4</b>	4655 <b>25.</b> 4	5121 25.4	4655 25.4	4655 25.4	58,659 25.4	
		23.4	10,1	23.1	23.1	23.1	2011	20.7	13.4		2311	20.1	23.4	2011	
1	MISC LD ELEC	۸	٥	۸	۸	۸	٨	۸	٨	٨	۸	۸	٥	٨	
	PK	0 0.0	0.0	0 0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	
2	MISC LD GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7	WT00 I D													4	
ა	MISC LD OIL	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
á	MISC LD														
,	P STEAM	0	0	0	0	0	0	0	0	. 0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	MISC LD														
	P HOTH20	0	0	0	Ö	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	- ' 0.0	
6															
	P CHILL PK	0 0.0	0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	´0	0.0	0 0.0	0 0.0	0.0	0	
	71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ1160S				COMP 25							_		•	
	ELEC PK	0.0	0 0.0	0 0.0	0 0.0	0.0	5222 61.3	10468 73.5	5235 60.4	0 46.6	0 0.0	0.0	0 0.0	20,925 73.5	
	1.11	0.0	***	V. 0	•••	0.0	01.0	70.3	00.4	40.0	٧.٠	V. V	0.0	70.5	
1		٨	COND	ENSER FA 0		۸	222	510	271	٨	۸	۸	٨	070	
	ELEC PK	0 0.0	0.0	0.0	0 0.0	0.0	222 3.2	519 4.0	231 3.2	0 2.3	0.0	0 0.0	- 0 0.0	972 4.0	
	P07700	•	00117	201.0											
1	EQ5302 ELEC	0	CONT 0	RULS 0	0	0	15	20	13	0	0	0	0	48	
	PK	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	
1	EQ4003		EC C	CHIDIC	FAN C.V.									•	
1	ELEC	0	0	0	0	612	1173	1324	1227	556	0	0	0	4,892	
	PK	0.0	0.0	0.0	0.0	2.8	6.6	6.6	6.6	6.6	0.0	0.0	0.0	6.6	
1	EQ4003		FC C	ENTRIF	FAN C.V.										
•	ELEC	Ō.	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	٠.

	ne Air Conditi Trane Customa			Network										V 600 PAGE 12
	PMENT ENERGY BUILDING	CONSUMPT	ION - AL	TERNATIV	E 1									
	ELEC PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2006 DIL PK	747 1.4	0IL 691 1.4	FIRE TUB 562 1.4	E STEAM 198 1.4	0 0.1	0.0	0.0	0.0	0.0	100 1.4	371 1.4	644 1.4	3,312 1.4
1	EQ5020 Elec PK	215 0.3	HEAT 194 0.3	WATER C 173 0.3	IRC. PUM 66 <b>0.3</b>	P C.V. 0 0.3	0.0	0.0	0.0	0 0.0	66 <b>0</b> .3	119 0.3	199 0.3	1,033
1	EQ5240 Elec PK	93 0.1	80ILI 84 0.1	FORCE 75 0.1	D DRAFT 28 0.1	FAN 0 0.1	0.0	0.0	0.0	0.0	28 0.1	52 0.1	86 0.1	446 0.1
1	EQ5307 Elec PK	328 0.5	80IL 296 0.5	ER CONTR 264 0.5	0LS 100 0.5	0 0.5	0.0	0.0	0.0	0.0	100 0.5	182 0.5	303 0.5	1,574 0.5
1	EQ5061 ELEC PK	4	COND! 4 0.0	ENSATE R 4 0.0	ETURN PUI 1 0.0	9P 0 0.0	0.0	0.0	0.0	0.0	10.0	2	4 0.0	21
1	EQ5406 WATER PK	0.0	MAKE- 0 0.0	-UP WATE 0 0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	2 0.0
1	EQ5040 ELEC PK	104 0.2	FUEL 94 0.2	OIL PUM 84 0.2	0 C.V. 32 0.2	0	0.0	0.0	0.0	0.0	32 0.2	58 0.2	97 0.2	501 - 0.2

## UTILITY PEAK CHECKSUMS - ALTERNATIVE 1

Sub Total

**Grand Total** 

. 1				
UTILITY PEA	K CHEC	K S U M S	}	
· )				
Equipment Description	Demand	Of Tot		
COMP 25-35 TONS	77.5	70.75		
	77.5	70.75		
	0.0	0.00		
FAN ELECTRICAL DEMAND	6.6	6.04		
	6.6	6.04		
	0.0	0.00		
	25.4 0.0 0.0	23.21 0.00 0.00		
	Equipment Description  COMP 25-35 TONS  FAN ELECTRICAL DEMAND	TAN ELECTRICAL DEMAND  COMP 25-35 TONS  TO	Utility Percnt Demand Of Tot (kW) (%)  COMP 25-35 TONS 77.5 70.75 77.5 70.75 0.0 0.00  FAN ELECTRICAL DEMAND 6.6 6.04 0.0 0.00  25.4 23.21 0.0 0.00	Utility Percnt Demand Of Tot (kW) (%)  COMP 25-35 TONS  77.5 70.75  77.5 70.75  0.0 0.00  FAN ELECTRICAL DEMAND  6.6 6.04  0.0 0.00  25.4 23.21 0.0 0.00

25.4 23.21

109.6 100.00

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   TRACE
      600
        ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code:

CARLISTE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: Longitude: 40.2 (deg)

77.2 (deg)

Time Zone:

5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hq)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb: Summer Design Wet Bulb:

92 (F) 72 (F)

Winter Design Dry Bulb:

Summer Ground Relectance:

4 (F)

0.20

Winter Ground Relectance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (8tu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4.790.2 (8tu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

11:52:11 1/19/94

Dataset Name:

CB253 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

------SYSTEM SUMMARY -------(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	3,276	12,387	1,547	0	1,035
2	UH	0	0	5,970	0	2,794	0	0
3	RAD	0	. 0	0	0	128	0	0
Totals		1,547	10,315	9,245	12,387	4,469	0	1,035

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

------SYSTEM SUMMARY -------(Design Capacity Quantities)

			(00.	ling					Heating			
			Aux. Sys.		_			Preheat	Reheat		Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(Btuh)
1	SZ	16.4	0.0	0.0	16.4	-232,997	. 0	-109,532	0	. 0	0	-232,997
2	UH	0.0	0.0	0.0	0.0	-311,059	0	0	0	0	0	-311,059
3	RAD	0.0	0.0	0.0	0.0	-11,650	0	0	0	0	0	-11,650
Totals		16.4	0.0	0.0	16.4	-555,706	. 0	-109,532	. 0	0	0	-555,706

The building peaked at hour 14 month 7 with a capacity of 16.1 tons

- ENGINEERING CHECKS - ALTERNATIVE 2 WALL & ROOF INSULATION

			Percent		Cool:	ing	Heat			
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	SZ	15.00	1.31	627.9	479.8	25.01	0.42	-29.56	7,882
2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.48	-24.80	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-68.94	169

System 1 Peak SZ - SINGLE ZONE

					*******	*******				***** HEAT	ING COIL PEAK	*******
Peaked at			Mo/Hr:	•				/Hr: 7	-		Mo/Hr: 13/ 1	
Outside A	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		* 04	AD8: 9	1 *		OADB: 4	
		Space	Pat Air	Ret. Air	Net	Derent	* Sr	1200	Percnt *	Space Pea	Coil Peak	Percnt
		Sens.+Lat.	Sensible			Of Tot			Of Tot *	•		Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)				(%) *	•	(Btuh)	
Skylite			0		0			0	0.00 *		) (550)	
Skylite		0	0		0			0	0.00 *		) 0	
Roof Co		0	5,437		5,437			0			-8,902	
Glass S		21,103	0		21,103			638			) 0	
Glass C		5,608	. 0		5,608				4.63 *		-28,015	
Wall Co		9,746	534		10,279				9.23 *		-24,112	
Partiti	ion	1,333			1,333		<b>*</b> 1,	333	1.21 *	-4,79	-4,797	2.28
Exposed	floor	0			0	0.00	*	0	0.00 *	(	) 0	0.00
Infiltr	ration	58,332			58,332	29.59	<b>*</b> 34,	560	31.39 *	-144,30	-144,306	68.67
Sub Tot	tal==>	96,121	5,970		102,091	51.78	* 79,	789	72.48 *	-199,550	-210,132	100.00
Internal	Loads					3	<b>k</b>		*			
Lights		28,131	0		28,131	14.27	<b>*</b> 27,	741	25.20 *	(	) 0	0.00
People		7,829	0		7,829	3.97			2.80 *	(	0	0.00
Misc		0	0	0	0			0	0.00 *	(	0	0.00
	cal==>			_	35,960		,	818	28.00 *	(	) 0	0.00
_		1,001	-1,001		0			538	0.49 *		0	
Outside A	\ir	0	0	0	43,580			0	0.00 *		) 0	0.00
Sup. Fan					11,003				0.00 *		0	0.00
Ret. Fan			7,224		7,224				0.00 *		, 0	0.00
Duct Heat	-		0		0				0.00 *		0	0.00
•	_	-1,065			-1,065			065	-0.97 *		) 0	0.00
Exhaust H			-1,646		-1,646				0.00 *		0	0.00
Terminal	Bypass		0	0	0		<b>k</b>		0.00 *		0	0.00
Grand Tot	1	172 014	10,548	. 0	107 147		• • 110,	080			-210,132	100 00
Grand Tot	.dl/	132,010	10,340	0	177,147	100.00	· 110,	VOV	100.00	-203,18	-210,132	100.00
			cool	LING COIL S	ELECTION						AREAS	
										Gross Total	Glass (	sf) ( <b>%</b> )
	(Tons)				Deg F De		-	_	Grains	Floor	,882	
_				10,315	78.3 68					Part 1		
Aux Clg	0.0		0.0	0		0.0		0.0	0.0		0	
•	0.0		0.0	0	0.0	).0 0.0	0.0	0.0	0.0		,955	0 0
Totals	16.4	197.1								Wall 3	3,560	403 11
	HEATIN	NG COIL SELE	ECTION		AI	RFLOWS (cfi	a)	E	NGINEERING	CHECKS	TEMPERATUR	ES (F)
	Capaci	ty Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clg	% OA	15.0	Type Cl	y Htg
	(Mbh)	) · (cfi	n) Deg F	Deg F		1,547	0	Clg	Cfm/Sqft	1.31	SADB 65	2 125.0
Main Htg	-233	.0 3,	276 59.6	125.0			2,072	Clg	Cfm/Ton		Plenum 75	
Aux Htg	0.	.0	0.0	0.0	Supply	10,315	3,276	Clg	Sqft/Ton	479.76	Return 76	.1 61.6
Preheat	-109	.5 10.3		64.2	Mincfm	0	0	Clg	Btuh/Sqft		Ret/0A 78	.3 61.6
Reheat	0.	. 0	0.0		Return		3,276	No.	People	17	Runarnd 75	.0 68.0
Humidif	0	. 0	0.0		Exhaust	1,391	0		% OA		Fn MtrTO 0	
Opt Vent	0.	.0	0.0	0.0	Rm Exh	1,035	. 0	Htg	Cfm/SqFt	0.42	Fn BldTD 0	.2 0.0
Total	-233				Auxil	Ō	. 0		Btuh/SqFt		Fn Frict 0	.6 0.0

System 2 Block UH - UNIT HEATERS

					********	******	-				****** HEAT			***
Outside	t Time ==		Mo/Hr: ADB/WB/HR:	•	۸		*			0/0 # 0 #	•	Mo/Hr: 13/ OADB: 4		
ourside i	H1(>	U	אחן פווין סעו:	0/ 0/ 0	. 0		*	U.F	נסטו	v 7		UHUD. 4		
		Space	Ret. Air	Ret. Air	Ne	t Percn	t *	Sr	ace	Percnt *	Space Pea	ak Coil Pe	ak Pe	rent
	S	ens.+Lat.	Sensible		Tota			Sensi		Of Tot *	· ·			Tot
Envelope		(Btuh)	(Btuh)		(Btuh		*		uh)	(%) *				(1)
Skylit		Ó	. 0		•		0 *	,	0	0.00 *		0	•	0.00
Skylit		0	0				0 *		0	0.00 *		0		0.00
Roof C		0	0				0 *		0	0.00 *		35 -32,2		0.38
Glass		0	. 0			0.0	0 *		0	0.00 *		0		0.00
Glass		0	. 0				0 *		0	0.00 *	-26,76	64 -26,7	64	8.60
Wall C		0	0				0 *		0	0.00 *				6.91
Partit		0					0 *		0	0.00 *				1.54
	d Floor	0					0 *		0	0.00 *	•			0.00
Infilt		0					0 *		0	0.00 *		90 -194,5		2.5€
Sub To		0	0				0 *		0	0.00 *				0.00
Internal		·	•			• • • • •	*		•	*	-	,.	-,	
Lights		0	0			0.0	0 *		0	0.00 *		0	0	0.00
People		0	V				0 *		0	0.00 *		0		0.00
Misc		٨	0	0			0 *		0	0.00 *		0		0.00
Sub To	taliis	0	0				0 *		0	0.00 *		Ô		0.00
Ceiling		٨	0	•			0 *		0	0.00 *		11		0.00
Outside (		. 0	0				0 *		0	0.00 *		0		0.00
		V	V	v			0 *		V	0.00 *		V		0.00
Sup. Fan Ret. Fan			0				0 *			0.00 *				0.00
			0				0 *			0.00 *				0.00
OV/UNDR		0	V				0 *		0	0.00 *		0		0.00
Exhaust	-	V	0	0			0 *		U	0.00 *		V		0.00
			0				0 *			0.00 *				0.00
Terminal	by pass		V	V	'	0.0	*			V.VV +			•	0.00
Grand To	+-1\	0	0	. 0		0.0	0 *		0	0.00 *		-311,0	50 10	0.00
Grand 10	tal/	v	V	. 0		0.0	V *		v	0.00 +	"320,24	511,0	37 10	<b>0.0</b> (
			coo	LING COIL S			•							
	Total	Capacity	Sens Cap.		l Enter	ing D8/W	8/HR			/WB/HR	Gross Tota	ıl Glass	(sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F D	eg F Gr	ains	Deg F	Deg F	Grains		2,541		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	1,853		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,614	0	0
Totals	0.0	0.0									Wall	6,759	385	6
	HEATIN	G COIL SEL	ECTION		A	IRFLOWS	(cfm)		8	NGINEERING	CHECKS	TEMPERAT	URES (F	}
	Capacit				Type	Coolin		Heating	Cla	% 0A	0.0			Htg
	(Mbh)	•			Vent		Õ	0	_	Cfm/Sqft		SAD8	0.0 1	_
Main Htg	-311.				Infil			2,794	-	Cfm/Ton		Plenum		59.8
Aux Htg	0.		0 0.0		Supply		0	5,970	_	Sqft/Ton		Return		68.0
Preheat	0.		0 0.0		Mincfm		0	0	Cla	Btuh/Sqft		Ret/OA		68.0
Reheat	0.		0 0.0		Return		0	5,970	No	People	0	Runarnd		68.0
Humidif	0.		0 0.0		Exhaust		0	3,770		* 0A	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.		0 0.0		Rm Exh		0	0	_	Cfm/SqFt		Fn BldTD	0.0	0.0
Total			v v.v	V.V	Auxil		0	. 0	_	Btuh/SqFt		Fn Frict	0.0	0.1
IULdl	-311.	1			MUXII		v	U	nıg	יייייייייייייייייייייייייייייייייייייי	24.00	IN LITER	v.v	V.

System 3 Block RAD - RADIATION

######################################	******
Dutside Air ==>	******
Space	
Sens.	
Sens.   Hat.   Sensible   Latent   Total   Of Tot   Sensible   Of Tot   Space   Sens   Tot Sens   Envelope Loads   (8tuh)   (8t	Percnt
Envelope Loads (8tuh) (8tuh) (8tuh) (8tuh) (\$\frac{1}{2}\) \$\ (8tuh) (\$\frac{1}\) \$\ (8tuh) (\$\frac{1}{2}\) \$\ (8tuh) (\$\f	Of Tot
Skylite Solr 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(\$)
Skylite Cond	0.00
Roof Cond	0.00
Glass Solar 0 0 0 0 0.00 * 0 0.00 * -1,250 -1,250    Mall Cond 0 0 0 0 0.00 * 0 0.00 * -1,250 -1,250    Mall Cond 0 0 0 0 0.00 * 0 0.00 * -716    Partition 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00    Exposed Floor 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00    Infiltration 0 0 0 0.00 * 0 0.00 * -8,915    Sub Total::> 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * -10,882    Internal Loads	2.92
Glass Cond	0.00
Wall Cond	10.73
Partition 0	9.83
Exposed Floor 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0 0 1	0.00
Infiltration	0.00
Sub   Total   Early   Sub   Total   Early   Sub   Total   Early   Sub   Total   Early   Sub   Sub   Carbon   Sub   Sub   Early   Sub   Sub   Carbon   Sub	76.52
Internal Loads	100.00
Lights	100.00
People	0.00
Misc 0 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0 0	0.00
Sub Total==> 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * -769 0 0 0 0 0.00 * -769 0 0 0 0 0.00 * -769 0 0 0 0 0.00 * -769 0 0 0 0 0.00 * -769 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 *	0.00
Ceiling Load 0 0 0 0 0.00 * 0 0.00 * -769 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00
Outside Air 0 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 *	0.00
Sup. Fan Heat	
Ret. Fan Heat 0 0 0.00 * 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 *	0.00
Duct Heat Pkup	0.00
OV/UNDR Sizing         0         0 0.00 *         0 0.00 *         0 0           Exhaust Heat         0         0         0 0.00 *         0.00 *         0           Terminal Bypass         0         0         0 0.00 *         0.00 *         0           Grand Total==>         0         0         0 0.00 *         0 0.00 *         -11,650	0.00
Exhaust Heat 0 0 0 0.00 * 0.00 * 0.00 * 0 0 0 0 0 0	0.00
Terminal Bypass 0 0 0 0 0.00 * 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00 * 0.00	0.00
Grand Total ==> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00
Grand Total ==> 0 0 0 0 0 0 0.00 * -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11,650 -11	0.00
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass ( (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 169  Main Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	100.00
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 169 Main Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	100.00
(Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 169  Main Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
Main Clg       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0	f) ( <b>%</b> )
Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
Opt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
Totals 0.0 0.0 Wall 371HEATING COIL SELECTION	
HEATING COIL SELECTION	0 0
	18 5
	S (F)
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Cl	
(Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.00 SADB 0	_
Main Htg -11.7 0 0.0 0.0 Infil 0 128 Clg Cfm/Ton 0.00 Plenum 0	
Aux Htg 0.0 0 0.0 Supply 0 0 Clg Sqft/Ton 0.00 Return 0	
Preheat 0.0 0 0.0 Mincfm 0 0 Clg Btuh/Sqft 0.00 Ret/OA 0	
Reheat 0.0 0 0.0 Return 0 0 No. People 0 Runarnd 0	
Humidif 0.0 0 0.0 Exhaust 0 0 Htg % OA 0.0 Fn MtrTD 0	
Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.00 Fn BldTD 0	
Total -11.7 Auxil 0 0 Htg Btuh/SqFt -68.94 Fn Frict 0	

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

BUILDING U-VALUES

						m U-Val /hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr	, , - 4.	Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr		Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	114.3	24.77
3	STORE	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.056	0.317	41.6	9.33
4	LOBBY	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	88.1	19.21
Zone	1 Total/Ave.	0.144	0.000	0.000	0.000	0.041	1.040	1.086	0.129	0.317	102.1	23.47
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
System	1 Total/Ave.	0.144	0.000	0.000	0.000	0.041	1.040	1.086	0.121	0.317	103.7	23.80
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	114.3	24.77
3	STORE	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.056	0.317	41.6	9.33
4	LOBBY ·	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	88.1	19.21
Zone	1 Total/Ave.	0.144	0.000	0.000	0.000	0.041	1.040	1.086	0.129	0.317	102.1	23.47
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.061	1.040	1.086	0.129	0.317	94.9	21.14
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
Ruildin	ď	0.144	0.000	0.000	0.000	0.054	1.040	1.086	0.124	0.317	99.0	22.30

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	BASEMENT	. 1	1	3,927	3,927	1,853	. 0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.	_			7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	. 0	0	0	0	169	18	5	353
Zone	2 Total/Ave.	-	_		169	0	0	0	0	169	18	5	353
System	1 Total/Ave.				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone .	1 Total/Ave.	_	_		7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	. 0	0	0	0	4,828	0	0	3,570
System					12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				169	0	0	0	0	169	18	5	353
Buildir					20,592	3,706	0	0	0	12,738	807	8	9,883

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.054 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.193 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.118 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.33 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 13.88 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals

Percent	Coo	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflox	v
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.8	0	0	-33,262	33	756	814.2	0	. 0	0.0	0	0
5 - 10	1.6	5	23	-66,524	13	295	1,628.5	0	0	0.0	0	0
10 - 15	2.5	5	27	-99,786	11	255	2,442.7	0	0	0.0	0	0
15 - 20	3.3	5	23	-133,048	7	156	3,256.9	0	0	0.0	0	0
20 - 25	4.1	0	0	-166,309	2	35	4,071.2	9	530	0.0	0	0
25 - 30	4.9	5	26	-199,571	1	17	4,885.4	0	0	0.0	0	0
30 - 35	5.8	12	60	-232,833	2	35	5,699.7	0	0	0.0	0	0
35 - 40	6.6	5	23	-266,095	1	16	6,513.9	83	5,088	0.0	0	0
40 - 45	7.4	5	27	-299,357	1	21	7,328.1	0	0	0.0	0	0
45 - 50	8.2	21	103	-332,619	31	711	8,142.4	0	0	0.0	0	0
50 - 55	9.0	0	0	-365,881	0	0	8,956.6	0	0	0.0	0	0
55 - 60	9.9	3	15	-399,143	0	0	9,770.8	0	0	0.0	0	0
60 - 65	10.7	0	0	-432,405	0	0	10,585.1	9	540	0.0	0	0
65 - 70	11.5	16	80	-465,667	0	0.	11,399.3	0	0	0.0	0	0
70 - 75	12.3	7	37	-498,929	0	0	12,213.5	. 0	0	0.0	0	0
75 - 80	13.1	0	0	-532,190	0	Ò	13,027.8	0	0	0.0	0	0
80 - 85	14.0	0	0	-565,452	0	0	13,842.0	0	0	0.0	0	0
85 - 90	14.8	0	0	-598,714	0	0	14,656.2	0	0	0.0	0	0
90 - 95	15.6	3	15	-631,976	0	0	15,470.5	0	0	0.0	0	0
95 - 100	16.4	7	35	-665,238	0	0	16,284.7	0	0	0.0	0	0
Hours Off	0.0	0	8,266	0	0	6,463	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- Zone Number Temperature 2 1 3 2 Range (F) 81.3 80.9 96.5 93.9 89.5 Max. Temp. Mo./Hr. 7 22 7 21 8 19 8 19 8 21 2 . Day Type ..... Number of Hours ..... 0 Above 100 0 95 - 1000 500 0 90 - 95 0 1,557 1,320 0 0 85 - 90 583 833 1,632 80 - 85 197 356 775 954 100 75 - 80 802 524 2,546 2,156 370 70 - 75 931 686 413 648 716 65 - 70 542 514 2,191 2,022 1,827 60 - 65 590 644 1,370 1,533 1,504 55 - 60 509 1,112 316 556 884 50 - 55 803 1,190 596 873 432 2,039 3,154 0 Below 50 Min. Temp. 37.1 30.5 54.9 54.9 54.9 2 8 2 10 1 3 1 6 1 12 Mo./Hr. 5 5 4 5 Day Type

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION ------

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	OIL (Therm)	WATER (1000 Gl)
Jan	5,530	27	664	0
Feb	5,018	27	616	0
March	5,811	27	444	0
April	4,851	27	155	0
May	5,584	28	0	0
June	10,131	74	0	0
July	15,620	95	0	0
Aug	12,312	85	0	0
Sept	5,076	75	0	0
0ct	5,263	27	44	0
Nov	4,936	27	296	0
Dec	5,239	27	571	0
Total	85,369	95	2,789	2

Building Energy Consumption = 27,694 (Btu/Sq Ft/Year)
Source Energy Consumption = 56,710 (Btu/Sq Ft/Year)

Floor Area = 20,592

20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

-----EQUIPMENT ENERGY CONSUMPTION-----------

				ŕ										
	Equip - Code	Jan	Feb	Mar	Apr	Mont May	hly Cons June	umption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS ELEC PK	4888 25.4	4423 <b>25.</b> 4	5354 <b>2</b> 5.4	4655 25.4	5121 25.4	5121 25.4	4655 25.4	5354 25.4	4655 25.4	5121 25.4	4655 25.4	4655 25.4	58,659 25.4
1	MISC LD ELEC PK	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD GAS PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD DIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
 	MISC LD P HOTH20 PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD P CHILL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1160S ELEC PK	0.0	AIR- 0 0.0	CLD COND 0 0.0	0 COMP 25 0 0.0	-35 TONS 0 0.0	3879 45.0	9190 59.5	5202 <b>4</b> 9. <b>9</b>	0 41.3	0.0	0.0	0.0	18,272 59.5
1	EQ5200 ELEC PK	<b>0</b> .0	CONE 0 0.0	DENSER FA 0 0.0	NS 0 0.0	0.0	159 1.8	430 3.0	214 2.4	0 1.8	0.0	0.0	0 0.0	803 3.0
1	EQ5302 ELEC PK	0.0	CONT 0 0.0	ROLS 0 0.0	0.0	0.0	11 0.1	20 0.1	18 0.1	0	0.0	0.0	0.0	49 0.1
1	EQ4003 ELEC PK	0.0	FC ( 0 0.0	CENTRIF. 0 0.0	FAN C.V. 0 0.0	463 2.1	960 6.6	1324 6.6	1523 6.6	421 6.6	0.0	0.0	0.0	4,691 6.6
1	EQ4003 ELEC PK	0.0	FC ( 0 0.0	CENTRIF. 0 0.0	FAN C.V. 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ4003		FC (	CENTRIF.	FAN C.V.					,	ilizare 21	Part.		

V 600 PAGE 25

EQUIPMENT	ENERGY	CONSUMPTION	-	ALTERNATIVE	2	
WALL & ROO	F INSU	ATTON				

	ELEC	0	. 0	0	0	0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2006		OIL	FIRE TUB	E STEAM									
_	OIL	664	616	444	155	0	0	0	0	0	44	296	571	2,789
	PK	1.4	1.4	1.4	1.4	0.1	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	185	172	132	56	0	0	0	0	0	41	81	169	837
	PK	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
1	EQ5240		BOIL	ER FORCE	DRAFT	FAN								
	ELEC	80	74	57	24	0	0	0	0	0	18	35	73	361
	PK	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
1	EQ5307		80IL8	ER CONTRO	DLS									
	ELEC	283	262	201	86	0	0	0	0	0	63	124	257	1,275
	PK	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1	EQ5061		COND	ENSATE RE	TURN PU	MP								
	ELEC	4	3	3	1	0	0	0	0	0	1	2	3	17
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5406		MAKE-	-UP WATER	?									
	WATER	0	0	0	0	0	0	0	0	0	0	0	0	2
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5040		FUEL	OIL PUMP	c.v.									
	ELEC	90	83	64	27	0	0	0	0	0	20	39	82	406
•	PK	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2

**Grand Total** 

UTILITY PEAK CHECKSUM WALL & ROOF INSULATION				
	UTILITY PEA	K CHEC	KSUMS	}
Utility ELECTRIC DE	MAND			
Peak Value 94. Yearly Time of Peak				
Hour 14 Month 7				
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)		
Cooling Equipment				
1 EQ1160S	AIR-CLD COND COMP 25-35 TONS	62.7	66.16	
Sub Total		62.7	66.16	
Sub Total		0.0	0.00	
Air Moving Equipment				
1	SUMMATION OF FAN ELECTRICAL DEMAND	. 6.6	6.99	

Sub Total	6.6	6.99
	0.0	0.00
Sub Total	0.0	0.00
Miscellaneous		
Lights	25.4	26.85
Base Utilities	0.0	0.00
Misc Equipment	0.0	0.00
Sub Total	25.4	26.85
Grand Total	94.7	100.00

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      TRACE
           600
             ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (dea) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (Btu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

. To September Design Simulation Period: May System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12: 7:28 1/19/94 Dataset Name: CB253 .TM

AIRFLOW - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

-----SYSTEM SUMMARY ------(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Main Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	4,331	12,844	1,547	0	1,035
	UH	0	. 0	7,035	0	3,209	0	0
	RAD	0	0	0	0	170	0	0
Totals		1,547	10,315	11,366	12,844	4,926	0	1,035

CAPACITY - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

			Coo.	ling					Heating			
System	System	Capacity	Capacity		Cooling Totals	Capacity	Capacity	Preheat Capacity	Reheat Capacity	Capacity		Heating Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(8tuh)	(Btuh)	(Btuh)
1.	SZ	22.1	0.0	0.0	22.1	-400,260	0	-252.030	0	0	0	-400,260
	UH	0.0	0.0	0.0	0.0	-386,318	0	0	0	0	0	-386,318
3	RAD	0.0	0.0	0.0	0.0	-18,830	0	0	0	0	0	-18,830
Totals		22.1	0.0	0.0	22.1	-805,408	0	-252,030	0	0	Ō	-805,408

The building peaked at hour 14 month 7 with a capacity of 20.7 tons

ENGINEERING CHECKS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

-----ENGINEERING CHECKS------ENGINEERING

			Percent		Cool:	ing		Heat	ting	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	SZ	15.00	1.31	467.0	356.9	33.63	0.55	-50.78	7,882
	Main	UH	0.00	0.00	0.0	0.0	0.00	0.56	-30.80	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-111.42	169

System 1 Peak SZ - SINGLE ZONE

Peaked at	******** t Time ==	>	Mo/Hr:				*	Mo	/Hr:	7/16		Mo/Hr: 1	3/ 1	
Outside (	Air ==>	OA	DB/WB/HR:	91/ 74/105.	0		*	0	ADB:	91	<b>.</b>	OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percn	t *	S	pace			ak Coil	Peak	Percnt
	S	ens.+Lat.	Sensible	Latent	Total	Of To	t *	Sens	ible	Of Tot 4	Space Se	ns Tot	Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)		) *	(B	tuh)	(名) 4				(\$)
Skylite		0	0		Ò		* 0		Ó	0.00			Ó	0.00
Skylite		0	0		(	0.0	0 *		0	0.00	1	0	0	0.00
Roof Co		0	0 <b>52</b> ,876		52,876	19.9	5 *		0	0.00 *		0 -30	,241	10.34
Glass	Solar	21,378	٨		21,378		7 *	29	,188	22.59			0	0.00
Glass (	Cond	5,608	. 0		5,608		2 *	5		3.97 4	-28,0	15 -28	,015	9.58
Wall Co	ond	19,751	2,412		22,162	8.3	6 ≭		,311	16.49		96 -53		
Partiti		1,333			1,333		) *		,333	1.03		97 -4		1.64
	d Floor	0			. (		0 *		0	0.00			0	0.00
Infilt		76,079			76,079			42	,048			34 -176	,134	
	tal==>	124,148	55,288		179,436					76.62 1		41 -292		
Internal		, - · -	, •		,		*			1		- · -	, -	
Lights		24,395	0		24,395	9.2	0 *	23	,632	18.29		0	0	0.00
People		7,913			7,913				,088	2.39		0	0	0.00
Misc		0	0	0	,				0	0.00		0	0	0.00
	tal==>	32,307			32,307			26	,720			0	0	0.00
		9.390	-9.390		, O			5		4.63 *		98	0	0.00
	Air		, 0		44,578				0	0.00		0	0	0.00
Sup. Fan					11,003					0.00 *			0	0.00
Ret. Fan			7,237		7,237					0.00 *			0	0.00
Duct Heat			0		, O					0.00 *			0	0.00
	Sizing	-2,489			-2,489			-2	,489	-1.93 *		0	0	0.00
	Heat		-7,027	0	-7,027		5 *			0.00 *	;		0	0.00
Terminal	Bypass		0		0	0.00	) *			0.00 *			0	0.00
							*			*				
Grand Tot	tal==>	163,357	46,107	. 0	265,044	100.00	*	129	,221	100.00 *	-268,6	39 -292	,571	100.00
			c001	LING COIL S	ELECTION							AREAS-		
	Total (	Capacity	Sens Cap.	Coil Airfl	Enteri	ng DB/W	3/HR	Leav	ving (	OB/WB/HR	Gross Tot	al Gla	ss (si	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Gra	ains	Deg F	Deg	F Grains	Floor	7,882		
Main Clg	22.1	265.0	208.8	10.315	81.4 6	8.6	37.0	62.5	60.	79.8	Part	1,853	•	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	3,955		0 0
Totals	22.1	265.0									Wall	3,560	4	403 11
	HEATIN	COIL SELE	CTION		AI	RFLOWS	(cfm)			-ENGINEERING	CHECKS	TEMPER	ATURES	S (F)
	Capacity	y Coil Ai	irfl Ent	Lvg	Type	Cooling	3	Heating	C:	lg % OA	15.0	Type	Clg	
	(Mbh)	(cf	n) Deg F	Deg F	Vent	1,547	7	0	C.	lg Cfm/Sqft	1.31	SADB		5 125.0
Main Htg	-400.3			125.0	Infil	2,529	7	0 2,529	C:	lg Cfm/Ton	467.02	Plenum	82.5	
Aux Htg	0.0	)	0.0	0.0		10,319	)	4,331	C	lg Sqft/Ton	356.86	Return	79.8	
Preheat	-252.0			62.5	Mincfm	(	)	0	C:	lg Btuh/Saft	33.63	Ret/OA	81.4	
Reheat	0.0	)	0.0	0.0	Return	10,177	7	4,331	No	o. People		Runarnd	75.0	
Humidif	0.0		0.0	0.0	Exhaust	1,409		0	H	tg % OA		Fn MtrTD		
Opt Vent	0.0	)	0.0	0.0	Rm Exh	1,039	5	. 0		tg Cfm/SqFt	0.55	fn BldTD		
Total	-400.3	,			Auxil	(		0		tg Btuh/SqFt		Fn Frict		

System 2 Block UH - UNIT HEATERS

Peaked at T			Mo/Hr:		^		*		/Hr:	· ·		Mo/Hr: 13	9/ 1	
Outside Air	==>	UA	D8/W8/HR:	0/ 0/ 0.	0		*	U	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Ne	et Pero	ent *	s	pace	Percnt *	Space Pe	ak Coil F	Peak	Percni
	Se	ns.+Lat.	Sensible	Latent	Tota	1 Of 1	fot *	Sens	ible	Of Tot *	Space Se	ens Tot S	ens	Of To
Envelope Lo	ads	(Btuh)	(Btuh)	(Btuh)	(Btuh	1) (	(%) *	(B	tuh)	(%) *	(Btu		tuh)	(\$)
Skylite S	olr	0	0			0 0.	* 00		0	0.00 *		0	0	0.00
Skylite Co	ond	0	0			0 0.	* 00		0	0.00 *		0	. 0	0.0
Roof Cond		0	0			0 0.	* 00		0	0.00 *	-23,7	35 -53	,053	13.73
Glass Sola	ar	. 0	0			0 0.	* 00		0	0.00 *		0	0	0.0
Glass Cond	d	0	0			0 0.	* 00		0	0.00 *	-26,7	64 -26	764	6.9
Wall Cond		Ō	0			0 0.	* 00		0	0.00 *	-74,2	57 -78	,211	20.2
Partition		0				0 0.	* 00		0	0.00 *			797	1.2
Exposed F	loor	0				0 0.	00 #		0	0.00 *			0	0.0
Infiltrat		0				0 0.	* 00		0	0.00 *	~223,4	93 -223,	493	57.8
Sub Total:		0	0			0 0.	* 00		0	0.00 *	-353,0	46 -386	318	100.0
Internal Loa							*			*				
Lights		0	0			0 0.	* 00		0	0.00 *		0	0	0.0
People		0				0 0.	* 00		0	0.00 *		0	0	0.0
Misc		0	0	0		0 0.	.00 *		0	0.00 *		0	0	0.0
Sub Total:	::>	0	0	0		0 0.	* 00		0	0.00 *		0	0	0.0
Ceiling Load		0	0				* 00		0	0.00 *		:67	0	0.0
outside Air		0	0	0		0 0.	00 *		0	0.00 *		0	0	0.0
Sup. Fan Hea						0 .0.	* 00			0.00 *			0	0.0
Ret. Fan Hea			0			0 0.	00 *			0.00 *			0	0.0
ouct Heat Pl			0			0 0.	* 00			0.00 *			0	0.0
V/UNDR Sizi		0				0 0.	* 00		0	0.00 *		0	0	0.0
xhaust Heat			0	0		0 0.	* 00			0.00 *			0	0.0
Terminal By	pass		0	0		0 0.	00 *			0.00 *			0	0.0
							*			*				
rand Total:	==>	0	0	0		0 0.	* 00		0	0.00 *	-392,3	13 -386,	318	100.0
			c00									AREAS		
. 1	Total Ca					ing D8/	WB/HR			8/WB/HR	Gross Tot	al Glas	s (st	f) ( <b>*</b> )
	Tons)		(Mbh)							Grains	Floor	•		
in Clg	0.0	0.0	0.0	0	0.0		0.0				Part	1,853		
ıx Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
ot Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,614		0
otals	0.0	0.0									Wall	6,759	3	385
	HEATING	COIL SELE	ECTION		A	IRFLOWS	(cfm)			ENGINEERING	CHECKS	TEMPERA	TURES	s (F)
	apacity	* .			Type	Cooli	ng	Heating	Cl	g % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfi	n) Deg F	Deg F	Vent		0	0	Cl	g Cfm/Sqft	0.00	SADB	0.0	119.
in Htg	-386.3			119.2	Infil		0	3,209	Cl	g Cfm/Ton	0.00	Plenum	0.0	0 40.
ıx Htg	0.0		0.0	0.0	Supply		0	7,035	Cl	g Sqft/Ton	0.00	Return	0.0	68.
reheat	0.0		0 . 0.0	0.0	Mincfm		0	0	Cl	g Btuh/Sqft	0.00	Ret/OA	0.0	68.
heat	0.0		0 0.0	0.0	Return		0 .	7,035	No	. People	0	Runarnd	0.0	68.
umidif	0.0		0 0.0	0.0	Exhaust		0	0		g % 0A	0.0	Fn MtrTO	0.0	0.
t Vent	0.0		0 0.0	0.0	Rm Exh		0	0		g Cfm/SqFt	0.56	Fn BldTD	0.0	0.0
tal	-386.3				Auxil		0	0		g Btuh/SqFt		Fn Frict	0.0	0.

System 3 Block RAD - RADIATION

	t Time ==		Mo/Hr: (	•	_	•	*			)/0 *		Mo/Hr: 13,		
Outside /	Air ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	0	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	N	et Per	cnt *	S	pace	Percnt *	Space Pea	k Coil Pe	eak	Percni
	S	ens.+Lat.	Sensible	Latent	Tot	al Of	Tot ≭	Sens	ible	Of Tot *	Space Sen			Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btu	h)	(%) *	(8	tuh)	(%) *	(Btuh	) (8t)	(dt	(\$)
Skylite	e Solr	0	0			0 0	.00 *		0	0.00 *	1	0	0	0.00
Skylite	e Cond	0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Roof Co	ond	0	0			0 0	.00 *		0	0.00 *		0 -9	923	4.90
Glass S	Solar	. 0	0			0 0	.00 *		0	0.00 *	:	0 .	0	0.00
Glass (	Cond	0	0			0 0	.00 *		0	0.00 *	-1,25	0 -1,2	250	6.6
Wall Co	ond	0	0			0 0	.00 *		0	0.00 *	-3,68	2 -4,8	316	25.5
Partiti	ion	0				0 0	.00 *		0	0.00 *		0	0	0.0
Exposed	d Floor	0				0 0	.00 *		0	0.00 *	:	0	0	0.0
Infilt		0				0 0	.00 *		0	0.00 *	-11,84	0 -11,8	340	62.88
Sub To		0	0			0 0	.00 *		0	0.00 *	-16,77	2 -18,8	330	100.0
Internal							*			*				
Lights		0	0			0 0	.00 *		0	0.00 *	,	Ō	0	0.0
People		0				0 0	.00 *		0	0.00 *	1	0	0	0.0
Misc		0	0	0		0 0	* 00.		0	0.00 *		0	0	0.0
Sub Tot	tal==>	0	0	0		0 0	.00 *		0	0.00 *		0	0	0.0
Ceiling (	Load	0	0			0 0	.00 *		0	0.00 *	-2,05	8	0	0.0
Outside A		0	0	0		0 0	.00 *		0	0.00 *		0	0	0.0
Sup. Fan						0 .0	.00 *			0.00 *			0	0.0
Ret. Fan			0			0 0	.00 *			0.00 *			0	0.0
ouct Heat			0			0 0	.00 *			0.00 *			0	0.0
V/UNDR S		0				0 0	.00 *		0	0.00 *		0	0	0.0
Exhaust l	-		0	0		0 0	.00 *			0.00 *			0	0.0
[erminal			0	0		0 0	.00 *			0.00 *			0	0.0
	•						*			*				
Grand Tot	tal==>	0	0	0		0 0	.00 *		0	0.00 *	-18,83	0 -18,8	330	100.00
			c00l	ING COIL S	ELECTION-							AREAS		
	Total	Capacity	Sens Cap.	Coil Airfl	Ente	ring DB	/WB/HR	Lea	ving D8	B/WB/HR	Gross Tota	l Glass	s (sf	(\$)
	(Tons)	(Mbh)	(Mbh)	(cfm)		Deg F		Deg F		Grains	Floor	169		
ain Clg	0.0	0.0	0.0	. 0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
ıx Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	.0.0	ExFlr	0		
ot Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	169		0
tals	0.0	0.0									Wall	371		18
	HEATIN	G COIL SEL	ECTION			AIRFLOW:	S (cfm)		E	NGINEERING	CHECKS	TEMPERAT	[URES	(F)
_		y Coil A		Lvg	Type	Cool		Heating		% OA	0.0	Type	Clg	Htg
	(Mbh)			Deg F	Vent		0	0	_	cfm/Sqft	0.00	SADB	0.0	
ain Htg	-18.		0 0.0	0.0	Infil		0	170		Cfm/Ton	0.00	Plenum	0.0	
ıx Htg	0.		0.0	0.0	Supply		0	0		Sqft/Ton	0.00	Return	0.0	
reheat	0.		0 0.0	0.0	Mincfm		Ō	0	-	Btuh/Sqft		Ret/OA	0.0	
eheat	0.		0 0.0	0.0	Return		0	0		People	0	Runarnd	0.0	
umidif	0.		0 0.0	0.0	Exhaust		0	0		% 0A	0.0	Fn MtrTD	0.0	
	٠.							_		•				
pt Vent	0.	0	0 0.0	0.0	Rm Exh		0	0	HIC	cfm/SqFt	0.00	Fn BldTD	0.0	0.

BUILDING U-VALUES - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

BUILDING U-VALUES

							m U-Val u/hr/sq1					Room	Room Capac.
Room					Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Des	cription	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASE	MENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECE	IVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STOR	Ε	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBB	Υ	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1	Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
. 5	BATH	ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2	Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	1	Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASE	MENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECE	IVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STOR	E	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBB'	Y	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1	Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED.	WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3	Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	2	Total/Ave.	0.144	0.000	0.000	0.000	0.137	1.040	1.086	0.200	0.317	93.8	20.92
5	8ATH	ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2	Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3	Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Buildin	a		0.144	0.000	0.000	0.000	0.162	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

-----BUILDING AREAS------

Room Number			er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	<b>35</b> 3
Zone	<pre>2 Total/Ave.</pre>				169	0	0	0	0	169	18	5	<b>35</b> 3
System	<ol> <li>Total/Ave.</li> </ol>				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	. 0	0	0	0	4,828	0	0	3,570
System	2 Total/Ave.				12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	<b>35</b> 3
Zone	<pre>2 Total/Ave.</pre>				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				169	0	0	0	0	169	18	5	<b>35</b> 3
Buildi	ng				20,592	3,706	0	0	0	12,738	807	8	9,883.

ASHRAE 90 ANALYSIS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.162 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.221 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.27 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVW) = 16.56 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

SYSTEM LOAD PROFILE -----

## System Totals

Percent	Cool	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	1.1	4	18	-52,872	39	1,069	867.5	0	0	0.0	0	0
5 - 10	2.2	0	0	-105,744	17	465	1,735.0	0	0	0.0	0	0
10 - 15	3.3	5	22	-158,616	12	326	2,602.5	0	0	0.0	0	0
15 - 20	4.4	2	8	-211,488	1	30	3,470.0	0	0	0.0	0	0
20 - 25	5.5	0	0	-264,359	1	16	4,337.5	10	590	0.0	Ō	0
25 - 30	6.6	11	52	-317,231	1	33	5,204.9	0	0	0.0	0	0
30 - 35	7.7	5	22	-370,103	1	35	6,072.4	0	0	0.0	0	0
35 - 40	8.8	8	38	-422,975	27	743	6,939.9	0	0	0.0	0	0
40 - 45	9.9	15	69	-475,847	0	0	7,807.4	83	5,088	0.0	0	0
45 - 50	11.0	10	45	-528,719	0	0	8,674.9	0	0	0.0	0	0
50 - 55	12.1	1	5	-581,591	0	0	9,542.4	0	0	0.0	0	0
55 - 60	13.3	7	34	-634,463	0	0	10,409.9	5	295	0.0	0	0
60 - 65	14.4	8	38	-687,335	0	0	11,277.4	3	185	0.0	0	0
65 - 70	15.5	13	60	-740,206	0	0.	12,144.9	0	0	0.0	0	0
70 - 75	16.6	0	0	-793,078	0	0	13,012.4	0	0	0.0	0	0
75 - 80	17.7	4	20	-845,950	0	0	13,879.9	0	Ō	0.0	0	0
80 - 85	18.8	4	20	-898,822	0	0	14,747.4	0	0	0.0	0	0
85 - 90	19.9	2	10	-951,694	0	0	15,614.8	0	0	0.0	0	0
90 - 95	21.0	0	0	-1,004,566	0	0	16,482.3	0	0	0.0	0	0
95 - 100	22.1	0	0	-1,057,438	0	0	17,349.8	0	0	0.0	0	0
Hours Off	0.0	0	8,299	0	0	6,043	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

					RUTI	DING	T F	MPF	RATI	BRF	pgn	FII	E S	 	 		 
								L		. 11 6						٠,	
Temperature									- Zone	Number				 	 		 
Range (F)	1	2	1	3	2												14
Max. Temp.	82.8	82.8	95.3	93.4	89.7												
Mo./Hr.	7 22			8 20													
Day Type	4			1													
				<b>.</b>					Number	of Hou	ırs			 	 		 
Above 100	0	0	0	0	0												
95 - 100	0	0	19	0	0												
90 - 95	0	0	1,481	1,180	0												
85 - 90	0		1,031		1,292												
80 - 85	355	301	397	873	1,044												
75 - 80	2,307	1,955	509														
70 - 75		1,049		746	488												
65 - 70	616	367	1,958	1,975	1,685												
60 ~ 65	308	119	1,478	1,584	1,147												
55 - 60	1,182	641	572	509	986												
50 - 55	615	832	668	596	1,270												
Below 50	2,547	3,496	0	0	0												
Min. Temp.	34.9	29.9	55.0	55.0	54.9												
Mo./Hr.	2 9	2 10															
Day Type	5	5	3														

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	OIL (Therm)	WATER (1000 Gl)
Jan	4,880	23	747	0
Feb	4,413	23	691	0
March	5,150	23	577	0
April	4,165	23	211	0
May	4,943	24	0	0
June	10,537	91	0	0
July	16,001	104	0	0
Aug	10,593	91	0	0
Sept	4,494	76	0	0
0ct	4,566	23	104	0
Nov	4,369	23	384	0
Dec	4,627	23	645	0
Total	78,737	104	3.359	2

Building Energy Consumption = 29,361 (Btu/Sq Ft/Year)
Source Energy Consumption = 56,324 (Btu/Sq Ft/Year)

Floor Area = 20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

----- EQUIPMENT ENERGY CONSUMPTION -----

₽of														
	Equip -							sumption						7.4.3
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS													
	ELEC	4135	3741	4528	3938	4332	4332	3938	4528 21.5	3938 21.5	4332 21.5	3938 21.5	3938 21.5	49,617 21.5
	ÞK	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
Ū	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD													
4	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MICO ID													
5	MISC LD P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
٠.	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD	^	. ^	٥	0	۸	0	٥	۸	٥	۸	٨	0	Ō
	P CHILL PK	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0
	, K	•••	•••	•••			• • • •		• • • •	***	•••			
1	EQ1160S				COMP 25									
	ELEC .	0 0.0	0 0.0	0.0	0.0	0 0.0	4813 59.4	10215 72.1	4693 <b>59.2</b>	0 45.9	0 0.0	0.0	0 0.0	19,722 <b>72</b> .1
	rn	0.0	0.0	V.V	V.0	V.V	37.4	12.1	J/.L	43.7	V.V	۷.۷	0.0	74.1
1	EQ5200			ENSER FA	NS									
	ELEC	0	0	0	0	0	205	503	205	0	0	0	0	913
	.PK	0.0	0.0	0.0	0.0	0.0	3.1	3.9	3.1	2.2	0.0	0.0	0.0	3.9
1	EQ5302		CONT	ROLS										
	ELEC	0	0	0	0	0	15	20	11	- 0	0	0	0	46
	PK	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
•	ELEC	0	0	0	0	612	1173	1324	1154	556	0	0	0	4,819
	PK	0.0	0.0	0.0	0.0	2.8	6.6	6.6	6.6	6.6	0.0	0.0	0.0	6.6
1	EQ4003		FC C	ENTRIF	FAN C.V.									
1	ELEC	0	0	0	0	0	0	0	0	0	0	. 0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ4003		FC C	ENTRIF	FAN C.V.									

Trane Air Conditioning Economics By: Trane Customer Direct Service Network PAGE 38 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS 0 ELEC 0 0 0 0 0 0 0 0 0 Ō 0 0 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ2006 OIL FIRE TUBE STEAM 104 384 645 3,359 OIL 747 577 211 0 0 691 0 0 0 PK 0.0 0.0 0.0 0.0 1.4 1.4 1.4 1.4 1.4 1.4 1.4 0.1 1.4 1 EQ5020 HEAT WATER CIRC. PUMP C.V. 199 ELEC 215 194 179 66 0 0 0 0 0 68 125 1,046 0.0 0.0 0.3 PK 0.3 0.3 0.3 0.3 0.0 0.0 0.3 0.3 0.3 0.3 1 EQ5240 BOILER FORCED DRAFT FAN ELEC 93 84 78 28 0 0 0 0 0 29 54 86 452 0.1 0.1 PK 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.1 0.1 0.1 0.0 BOILER CONTROLS 1 E05307 0 190 1,594 ELEC 328 296 274 100 0 0 Û 0 103 303 0.5 0.0 0.0 0.5 0.5 PK 0.5 0.5 0.5 0.5 0.0 0.0 0.5 0.5 1 EQ5061 CONDENSATE RETURN PUMP ELEC 0 0 0 0 21 0 1 3 4 4 4 1 4 0.0 0.0 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ5406 MAKE-UP WATER 0 0 0 0 0 0 0 0 0 0 2 WATER 0 0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ5040 FUEL OIL PUMP C.V.

0

0.0

ELEC

PK

104

0.2

94

0.2

87

0.2

32

0.2

0

0.2

0

0.0

0

0.0

0

0.0

33

0.2

60

0.2

97

0.2

507

0.2

V 600

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

**Grand Total** 

 UTILITY	PEAK	CHECKSUMS	

104.2 100.00

		UTILITY PEAK	CHEC	KSUM
Utility	ELECTRIC DE			
Peak Valu Yearly Ti		(kW) 16 (hr) 7 (mo)		
Hour 16	Month 7			
Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	
Cooling E	quipment			
1	EQ1160S	AIR-CLD COND COMP 25-35 TONS	76.1	73.01
Sub Total			76.1	73.01
Sub Total			0.0	0.00
Air Movin	g Equipment			
1		SUMMATION OF FAN ELECTRICAL DEMAND .	6.6	6.35
Sub Total			6.6	6.35
Sub Total			0.0	0.00
Miscellan	eous			
Lights Base Uti Misc Equ Sub Total	ipment		21.5 0.0 0.0 21.5	20.64 0.00 0.00 20.64

******************************* ********************** ** ** 600 ANALYSIS TRACE ** ** ** ** *********************** ************************

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude:

40.2 (deg)

Longitude:

77.2 (deg) 5

Time Zone:

475 (ft)

Elevation:

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00 1.00

Winter Clearness Number:

92 (F)

Summer Design Dry Bulb: Summer Design Wet Bulb:

72 (F)

Winter Design Dry Bulb:

Summer Ground Relectance:

4 (F)

0.20

Winter Ground Relectance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (Btu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4,790.2 (8tu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

12:22:28 1/19/94

Dataset Name:

CB253 .TM

AIRFLOW - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

------ SYSTEM SUMMARY ------ (Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Main Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	4,331	12,844	1,547	0	1,035
2	UH	. 0	0	7,035	0	3,209	0	0
3	RAD	0	0	0	0	170	0	0
Totals		1,547	10,315	11,366	12,844	4,926	0	1,035

CAPACITY - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

(Design Capacity Quantities)

		Coo	ling					Heating			
	-	-	Opt. Vent		Main Sys.	· ·	Preheat	Reheat		Opt. Vent	Heating
System System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number Type	(Tons)	(Tons)	(Tons)	(Tons)	(8tuh)	(Btuh)	(8tuh)	(8tuh)	(Btuh)	(Btuh)	(8tuh)
1 SZ	21.7	0.0	0.0	21.7	-400,260	0	-254,892	0	0	0	-400,260
2 UH	0.0	0.0	0.0	0.0	-386,318	0	0	0	0	0	-386,318
3 RAD	0.0	0.0	0.0	0.0	-18,830	0	0	0	0	0	-18,830
Totals	21.7	0.0	0.0	21.7	-805,408	0	-254,892	0	0	0	-805,408

The building peaked at hour 14 month 7 with a capacity of 20.3 tons

ENGINEERING CHECKS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- ENGINEERING CHECKS--------------------

			Percent		Cool:		Heating			
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	. Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	.Main	SI	15.00	1.31	475.6	363.4	33.02	0.55	-50.78	7,882
.2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.56	-30.80	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-111.42	169

System 1 Peak SZ - SINGLE ZONE

					*******					***** HEAT			***
Peaked a			Mo/Hr: DB/WB/HR:		^			/Hr:	91 *		Mo/Hr: 13/ OADB: 4		
UULS1QE	H11>	UH	יאט/אט/חא:	71/ /4/103.0	J		* UI	HVO:	71 *		UHUD. 4		
		Space	Ret. Air	Ret. Air	Net	Percnt	* S:	pace	Percnt *	Space Pea	k Coil Pe	ak Per	rent
	;	Sens.+Lat.	Sensible			Of Tot			Of Tot *	•			Tot
Envelope		(8tuh)	(Btuh)		(Btuh)	(%)		tuh)	(%) *		) (Btu		(\$)
Skylit	e Solr	0	0		0	0.00	k	0	0.00 *		0		0.00
Skylit			0		0	0.00	<b>*</b>	0	0.00 *		0	0 0	0.00
Roof C	ond	0	52,876		52,876	20.32	ŧ	0	0.00 *		0 -30,2	41 10	0.34
Glass	Solar	21,378	0		21,378	8.21	<b>k</b> 29	,188	23.10 *		0	0 0	0.00
Glass	Cond	5,608	0		5,608	2.15	<b>*</b> 5,	,130	4.06 *	-28,01	5 -28,0	15 9	9.58
Wall C	ond	19,751	2,412		22,162	8.52	k 21,	,311	16.87 *	-48,29	6 -53,3	84 18	B.25
Partit	ion	1,333			1,333	0.51	t 1,	, 333	1.05 *	-4,79	7 -4,7	97 1	1.64
Expose	d Floor	0			0	0.00	<b>*</b>	0	0.00 *		0	0 0	0.00
Infilt	ration	74,974			74,974	28.81	k 42.	,048	33.28 *	-176,13	4 -176,1	34 60	0.20
Sub To	tal==>	123,043	55,288		178,330			010		-257,24	1 -292,5	71 100	0.00
Internal	Loads	•	•		•		<b>k</b>		*				
Lights		21,425	0		21,425	8.23	<b>k</b> 20.	,770	16.44 *		0	0 0	0.00
People		7,913			7,913	3.04	k 3.	,088	2.44 *		0	0 0	00.0
Misc		0	0	0	0	0.00	k	0	0.00 *		0	0 0	0.00
Sub To	tal==>	29,338	0	0	29,338	11.27	23,	,858	18.88 *		0	0 0	0.00
Ceiling	Load	9,390	-9,390		0	0.00	k 5.	,981	4.73 *	-11,39	8	0 0	0.00
Outside &	Air	0	0	0	43,863	16.85	k	0	0.00 *		0	0 0	00.0
Sup. Fan	Heat				11,003	4.23	k		0.00 *			0 0	0.00
Ret. Fan	Heat		7,237		7,237	2.78			0.00 *			0 0	0.00
Duct Hear	t Pkup		0		0	0.00	k		0.00 *			0 0	0.00
OV/UNDR S	Sizing	-2,489			-2,489	-0.96	-2,	489	-1.97 *		0	0 0	00.0
Exhaust 1	Heat		-7,027	0	-7,027	-2.70	k		0.00 *			0 0	0.00
Terminal	Bypass		0	0	0	0.00	k		0.00 *			0 0	0.00
•••						,	k		*				
Grand Tot	tal==>	159,281	46,107	0	260,254	100.00	126,	359	100.00 *	-268,63	9 -292,5	71 100	0.00
			Sens Cap.							Gross Tota		(sf) (	(\$)
	(Tons)		(Mbh)						Grains	Floor	•		
Main Clg	21.7	260.3		10,315					80.6		1,853		
Aux Clg	0.0	0.0	0.0			0.0		0.0		ExFlr	0		
Opt Vent	0.0		0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	3,955	0	
Totals	21.7	260.3								Wall	3,560	403	11
		,	ECTION						ENGINEERING		TEMPERAT		
		y Coil Ai					Heating		g % 0A				itg
	(Mbh)				Vent	1,54/	0	Cl	g Cfm/Sqft			63.7 12	
Main Htg	-400.				Infil	2,529	2,529		g Cfm/Ton				39.8
-	0.				Supply		4,331		g Sqft/Ton				5.2
Preheat	-254.					0	0		g Btuh/Sqft				15.2
Reheat	0.				Return		4,331		. People				8.0
Humidif	0.		0 0.0			1,409	0	Ht	g % OA		Fn MtrTD		0.0
Opt Vent	0.		0.0			1,035	0		g Cfm/SqFt		Fn 81dTD		0.0
Total	-400.	3			Auxil	0	0	Нt	g Btuh/SqFt	-50.78	Fn Frict	0.6	0.0

System 2 Block UH - UNIT HEATERS

			COOFING COIF	PEHN ****	*******	******	****	**** ULG	SPHUE	: PEHK ****	***** HEA	TING COI	L PEAK	******
Peaked a	t Time =	=>	Mo/Hr:	0/0			*		/Hr:		<b>t</b>	Mo/Hr:		
Outside	Air ==>	0:	ADB/WB/HR:	0/ 0/ 0	.0		*	0	ADB:	0	<b>t</b>	OAD8:	•	
		Space	Ret. Air	Ret. Air	Ne	t Percn	.t *	Sı	pace	Percnt ?	Space Pe	ak Coi	l Peak	Percnt
	1	Sens.+Lat.	Sensible							Of Tot			t Sens	Of Tot
Envelope		(Btuh)	(8tuh)				*			(%)	•		(Btuh)	(\$)
Skylite		Ó					0 *	(-	0	0.00			0	0.00
Skylite		0	0				0 *		Ō	0.00		0	0	0.00
Roof Co		0	0			0.0			0	0.00		35 -:	53,053	13.73
Glass S		0	0				0 *		0	0.00			0	0.00
Glass (	Cond	. 0	0				0 *		0	0.00		64 -:		6.93
Wall Co		0	0				0 *		ō	0.00			78,211	20.25
Partiti		0	-				0 *		ō	0.00			-4,797	1.24
	d Floor	0					0 *		0	0.00			0	0.00
Infilta		0					0 *		0	0.00			23,493	57.85
Sub Tot		0	0				0 *		0	0.00 *	· · · · · · · · · · · · · · · · · · ·		36,318	100.00
Internal		·	V				*		v	V. VV · ·	-	,,, ,(	55,010	100.00
Lights		0	0			0 0.0	0 *		0	0.00 *		0	0	0.00
People		0	v				0 *		0	0.00 *		0	0	0.00
Misc		٥	0	0			0 *		0	0.00 *		0	0	0.00
Sub Tot	talizzo	0	0	0			0 *		0	0.00 *		0	0	0.00
Ceiling L		٥	0	V			0 *		0	0.00 *		-		0.00
Outside A		. 0	0	0			0 *		0	0.00 *		0	0	
Sup. Fan		V	v	V			0 *		v			U	0	0.00
Ret. Fan			0				0 *			0.00 * 0.00 *			0	0.00
Duct Heat			0				0 *			0.00 *			0	0.00
OV/UNDR S		0	V				) *		0	0.00 *		0	0	0.00
Exhaust H	_	V	0	0	,		0 *		V	0.00 *		V	0	0.00
Terminal			0	0			) *			0.00 *			0	0.00
	o, pass		v	V	,	0.00	*			*			0	0.00
Grand Tot	:al==>	0	0	0	(	0.00			0	0.00 *		3 -38	86,318	100.00
			cool	THE COTE S	FI FOTTON							ADCAC		
			Sens Cap.											f) (%)
_	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De					Grains	Floor		(0)	, , , ,
fain Clg	0.0		0.0								Part	•		
Aux Clg	0.0	0.0	0.0	0	0.0		0.0	0.0	0.0	0.0		0		
opt Vent	0.0	0.0	0.0	0	0.0		0.0	0.0	0.0	0.0		8,614		0 0
<b>Totals</b>	0.0	0.0							•••	•••		6,759	3	385 6
	HEATIN	G COIL SEL	ECTION		A1	(RFLOWS (	cfm)-		{	ENGINEERING	CHECKS	TEMPE	RATURES	S (F)
•	Capacit				Type	Cooling		Heating		% OA	0.0	Type	Clg	. ,
	(Mbh)	•		Deg F	Vent	0		0		Cfm/Sqft	0.00	SADB	-	119.2
lain Htg	-386.			119.2	Infil		) ·	3,209		Cfm/Ton		Plenum	0.0	
ux Htg	0.		0.0	0.0	Supply	0			-	Sqft/Ton	0.00	Return	0.0	
reheat	0.		0.0	0.0	Mincfm	Ö		0	_	Btuh/Sqft		Ret/OA	0.0	
leheat	0.		0 0.0	0.0	Return	0		7,035		People	0	Runarnd		
lumidif	0.		0 0.0	0.0	Exhaust	0		7,000		\$ 0A	0.0	Fn MtrT		
pt Vent	0.		0 0.0	0.0	Rm Exh	0		0		Cfm/SqFt		Fn BldT		
otal	-386.				Auxil	0		0	_	Btuh/SqFt				
- 741	000.	•			HWALL	·		V	nrg	1 oraniadre	JV. 6V	Fn Fric	t 0.0	0.1

System 3 Block RAD - RADIATION

	it Time ==		Mo/Hr: (				*		/Hr:	0/0 *		Mo/Hr: 13	/ 1	
Outside	Air ==>	0A	D8/WB/HR:	0/ 0/ 0.	0		*	. 0	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Ne	t Perci	r nt *	. \$	pace	Percnt *	Space Pe	ak Coil P	eak	Percn
	S	Gens.+Lat.	Sensible	Latent	Tota		ot *	Sens		Of Tot *				Of To
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh		है) *		tuh)	(%) *			uh)	(\$
-	e Solr	0	0	(/			00 *	<b>\</b> -	Ó	0.00 *		Ó	0	0.0
-	e Cond	0	0			0 0.0			0	0.00 *		0	0	0.0
Roof C		0	0				00 *		0	0.00 *		0 -	923	4.9
Glass		. 0	0			0 0.0	00 *		0	0.00 *		0	0	0.0
Glass	Cond	, 0	0			0 0.0	)() *		0	0.00 *	-1,2	50 -1,	250	6.6
Wall C		0	0		,*	0 0.0			0	0.00 *			816	25.5
Partit		0					00 *		0	0.00 *		0	0	0.0
	d Floor	0					00 *		0	0.00 *		0	0	0.0
	ration	0					00 *		0	0.00 *		-	-	62.8
	tal==>	0	0				00 *		0	0.00 *				100.0
Internal		•	V				*		٧	*	•	,	J	
Lights		0	0			0 0.0	00 *		0	0.00 *		0	0	0.0
People		0	v				)0 *		Õ	0.00 *		0	Õ	0.0
Misc		0	0	0			00 *		Ô	0.00 *		0	0	0.0
Sub To	talin	0	0	0			00 *		0	0.00 *		0	0	0.0
Ceiling		0	0	٧			00 *		Ö	0.00 *		-	0 -	0.0
Dutside		. 0	0	0			)0 *		0	0.00 *		0	0	0.0
Sup. Fan		V	v	V			00 *		V	0.00 *		V	0	0.0
Ret. Fan			0				00 *			0.00 *			0	0.0
Ouct Hea			0				00 *			0.00 *			0	0.0
DUCT HEADY/UNDR		0	V				)0 *		0	0.00 *		0	0	0.0
Exhaust	-	V	0	0			00 *		V	0.00 *		V	0	0.0
Terminal			0	0			00 *			0.00 *			0	0.0
I C I III T II G T	uypass		V	V		0.0	*			v.vv *			v	۷.۷
arand To	tal==>	0	0	0		0 0.0	00 *		0	0.00 *		30 -18,	830	100.0
			0001	THO 00TL 0										
			COOL Sens Cap.			ing DB/W		Lea		B/WB/HR	Gross Total	AREAS al Glas		) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F D					Grains	Floor	169	• (5.	, , , ,
ain Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		Part	0		
ux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	Ö		
ot Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		Roof	169		0
otals		0.0	***		•••	•••	***	•••	• • • •	•••	Wall	371		18
	UCATIN	C COTI SELE	CTION		A	TOFIOMS	(cfm)			ENGINEERING	CHECKS	TEMPERA	TUDES	(E)
	Capacit				Туре					g % OA	0.0	Type	Clg	
-	(Mbh)				Vent		0 .	learing 0		g Cfm/Sqft		SADB	0.0	
ain Htg	-18.		0 0.0	0.0	Infil		0 -	170		g Cfm/Ton		Plenum	0.0	
x Htg	0.		0 0.0	0.0	Supply		0	. 0		g Sqft/Ton	0.00	Return	0.0	
reheat	0.		0 0.0	0.0	Mincfm		0	0		g Stuh/Sqft		Ret/OA	0.0	
			0 0.0	0.0	Return		0	0		y brom/sqrr . People	0.00	Runarnd	0.0	
eheat .				0.0	Exhaust							Fn MtrTD		
umidif	0.						0	0		g % OA	0.0		0.0	
pt Vent	0.0		0.0	0.0	Rm Exh		0	0		g Cfm/SqFt		Fn 81dTD	0.0	
otal	-18.	<mark>୪</mark>			Auxil		0	0	H t	g Btuh/SqFt	<b>-111.42</b>	Fn Frict	0.0	0

BUILDING U-VALUES - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

BUILDING U-VALUES

							Room Mass	Room Capac.				
Room		•		Summr	Wintr	/hr/sqf	Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.137	1.040	1.086	0.200	0.317	93.8	20.92
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Ruildin	O.	0.144	0.000	0.000	0.000	0.162	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	L088Y	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	<b>3</b> 53
System	1 Total/Ave.				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	. 0	0	0	0	4,828	0	0	3,570
System	<pre>2 Total/Ave.</pre>				12,541	1,853	. 0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	<pre>2 Total/Ave.</pre>				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				. 169	0	0	0	0	169	18	5	353
Buildin	g				20,592	3,706	0	0	0	12,738	807	8	9,883.

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.162 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.221 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.27 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVW) = 16.56 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

------SYSTEM LOAD PROFILE-----

## System Totals

Percent	Cool	ling Loa	nd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours		Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	1.1	0	0	-53,015	38	1,031	867.5	0	0	0.0	0	0
5 - 10	2.2	4	18	-106,030	17	467	1,735.0	0	0	0.0	0	0
10 - 15	3.3	. 2	8	-159,045	13	345	2,602.5	0	0	0.0	0	0
15 - 20	4.3	4	19	-212,060	2	42	3,470.0	0	0	0.0	0	0
20 - 25	5.4	8	33	-265,075	0	5	4,337.5	10	612	0.0	0	0
25 - 30	6.5	0	0	-318,090	1	16	5,204.9	0	0	0.0	0	0
30 - 35	7.6	5	22	-371,105	2	52	6,072.4	0	0	0.0	0	0
35 - 40	8.7	10	42	-424,120	28	759	6,939.9	0	0	0.0	0	0
40 - 45	9.8	15	65	-477,135	0	0	7,807.4	83	5,088	0.0	0	0
45 - 50	10.8	11	50	-530,150	0	0	8,674.9	0	0	0.0	0	0
50 - 55	11.9	0	0	-583,165	0	0	9,542.4	0	0	0.0	0	0
55 - 60	13.0	8	34	-636,180	0	0	10,409.9	5	295	0.0	0	0
60 - 65	14.1	9	38	-689,195	0	0	11,277.4	3	163	0.0	0	0
65 - 70	15.2	14	60	-742,210	0	0.	12,144.9	0	0	0.0	0	0
70 - 75	16.3	0	0	-795,225	0	0	13,012.4	0	0	0.0	0	0
75 - 80	17.4	5	20	-848,240	0	0	13,879.9	0	0	0.0	0	0
80 - 85	18.4	5	20	-901,255	0	0	14,747.4	0	0	0.0	0	0
85 - 90	19.5	2	10	-954,270	0	0	15,614.8	0	0	0.0	0	0
90 - 95	20.6	0	0	-1,007,285	0	0	16,482.3	0	0	0.0	0	0
95 - 100	21.7	0	0	-1,060,300	0	0	17,349.8	0	0	0.0	0	0
Hours Off	0.0	0	8,321	0	0	6,043	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

					BUI	LDING TEMPERATURE PROFILES	
							Ž.
Temperature						Zone Number	
Range (F)	1	2	1	. 3	2	2	
Max. Temp.	82.7	82.8	94.8	92.9	89.7	1	
Mo./Hr.				8 19			
Day Type	4						
						Number of Hours	
Above 100	0	0	0	0	0		
95 - 100	0	0	0	0	0		•
90 - 95	0	0	1,412	997			
85 - 90	0			1,035			
80 - 85	355				1,044		
75 - 80		1,955					
70 - 75		1,049				}	•
65 - 70	666			1,937	1,685		
60 - 65	312			1,630			
55 - 60	1,179						
50 - 55	601		672	596	1,270		
Below 50	2,564	3,496	0	0	0		
Min. Temp.	34.8	29.9	54.9	55.0	54.9		
Mo./Hr.	2 8			1 20			
Day Type	5						

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND		
	Off Peak	On Peak	OIL	WATER
Month	(k₩h)	(kW)	(Therm)	(1000 Gl)
Jan	4,367	20	747	0
Feb	3,949	20	691	0
March	4,588	20	587	0
April	3,695	20	222	0
May	4,406	22	0	0
June	9,489	89	0	0
July	15,336	101	0	0
Aug	9,723	87	0	0
Sept	4,006	73	0	0
Oct	4,029	20	107	0
Nov	3,881	20	<b>39</b> 3	0
Dec	4,139	20	645	0
Total	71,609	101	3,393	2

Building Energy Consumption = 28,345 (Btu/Sq Ft/Year)
Source Energy Consumption = 52,953 (Btu/Sq Ft/Year)

Floor Area = 20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip - Code	Jan	Feb	Mar	Apr	Mont May	hly Con: June	sumption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS Elec PK	3622 18.9	3277 18.9	3967 18.9	3450 18.9	3795 18.9	3795 18.9	3450 18.9	3967 18.9	3450 18.9	3795 18.9	3450 18.9	3450 18.9	43,465 18.9
1	MISC LD ELEC PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD GAS PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD OIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD P HOTH20 PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD P CHILL PK	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1160S ELEC PK	0.0	AIR- 0 0.0	CLD COND 0 0.0	COMP 25 0 0.0	-35 TONS 0 0.0	4407 <b>5</b> 9.9	10050 71.3	4399 58.5	0 45.4	0.0	0 0.0	0	18,856 71.3
1	EQ5200 ELEC PK	, 0.0	COND 0 0.0	ENSER FA 0 0.0	NS 0	0.0	187 3.1	492 3.8	191 3.0	0 2.2	0.0	0.0	0	870 . 3.8
1	EQ5302 ELEC PK	0	CONT 0 0.0	ROLS 0 0.0	0.0	0.0	12 0.1	20 0.1	11	0 0.1	0.0	0.0	0	44 0.1
1	EQ4003 ELEC PK	0 0.0	FC C 0 0.0	ENTRIF. 0 0.0	FAN C.V. 0 0.0	612 2.8	1088 6.6	1324 6.6	1154 6.6	556 6.6	0.0	0.0	0.0	4,735
1	EQ4003 ELEC PK	0 0.0	FC C 0 0.0	ENTRIF. 0 0.0	FAN C.V. 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
2	EQ4003		FC C	ENTRIF.	FAN C.V.							ر الم		e de la companya de La companya de la co

V 600 PAGE 51

## EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	ō
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2006		OIL	FIRE TUB	E STEAM									-
	OIL	747	691	587	222	0	0	0	0	0	107	393	645	3,393
	PK	1.4	1.4	1.4	1.4	0.1	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	215	194	179	71	0	0	0	0	0	68	125	199	1,051
	PK	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
1	EQ5240		BOIL	ER FORCE	D DRAFT	FAN								
	ELEC	93	84	78	31	0	0	0	0	0	29	54	86	454
	PK	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
1	EQ5307		BOIL	ER CONTR	DLS									
	ELEC	328	296	274	108	0	0	0	0	0	103	190	303	1,602
	PK	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	4	4	4	1	0	0	0	0	0	1	3	4	21
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5406		MAKE-	-UP WATE	R									
	WATER	0	0	0	0	0	0	0	0	0	0	0	0	2
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5040		FUEL	OIL PUM	P.C.V.									
	ELEC	104	94	87	34	0	0	0	0	0	33	60	97	510
•	PK	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

UILIIY	PEAK	C H E C K S U M S

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 100.6 (kW)Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

1104. 20 11011011				
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)		
Cooling Equipment				
1 EQ1160S	AIR-CLD COND COMP 25-35 TONS	75.2	74.69	
Sub Total		75.2	74.69	
Sub Total		0.0	0.00	
Air Moving Equipment				
1	SUMMATION OF FAN ELECTRICAL DEMAND	6.6	6.58	
Sub Total		6.6	6.58	
Sub Total		0.0	0.00	
Miscellaneous				
Lights		18.9	18.73	
Base Utilities		0.0		
Misc Equipment			0.00	
Sub Total		18.9	18.73	
Grand Total		100.6	100.00	

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**
**
      TRACE
          600
             ANALYSIS
**
                       **
**
      by
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES **BUILDING 253** 

Weather File Code: CARLISLE

ENERGY SAVINGS OPPORTUNITY STUDY Location:

Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft)

Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) (F) Winter Design Dry Bulb: Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13:57:39 12/27/93 CB253B .TM

Dataset Name:

AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

(Design Airflow Quantities)

					Auxil.	Room		
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	4,331	12,844	1,547	0	1,035
2	UH	0	0	7,035	0	3,209	0	0
3	RAD	0	. 0	0	0	170	0	0
Totals		1.547	10.315	11.366	12 844	4 926	0	1 035

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

									Heating			
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
1	SZ	21.2	0.0	0.0	21.2	-400,260	0	-258,452	0	0	0	-400,260
2	UH	0.0	0.0	0.0	0.0	-386,318	0	Ō	0	Ō	0	-386,318
3	RAD	0.0	0.0	0.0	0.0	-18,830	0	0	0	0	Ō	-18,830
Totals		21.2	0.0	0.0	21.2	-805,408	0	-258,452	0	0	0	-805,408

The building peaked at hour 14 month 7 with a capacity of 19.8 tons

- ENGINEERING CHECKS - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

----- ENGINEERING CHECKS-----

			Percent		Cool:	ing		Heat	ting	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SI	15.00	1.31	486.8	372.0	32.26	0.55	-50.78	7,882
2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.56	-30.80	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-111.42	169

System 1 Peak SZ - SINGLE ZONE

Peaked a	t lime	::>	MO/Hr:	//14	•		ī	0400	. //			•	-	
Outside	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		¥	OADB	: 91	, *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Spac	е	Percnt *	Space Pe	ak Coil	Peak	Percni
		Sens.+Lat.		Latent	Total			Sensibl			Space Se			Of Tot
Envelope	Loads	(Btuh)			(Btuh)			(Btuh	)	(%) ±	(Rtu	h) (	Rtub)	(4)
Skylit	e Solr	0	Ó	,	Ó			·	0	0.00 *	•	Ó	Ó	0.00
Skylit	e Cond	0	0		0	0.00			0	0.00 *		0	0	0.00
Roof C	ond	0 0 0	52,876		52,876				0	0.00 *	-28,0 -48.2	0 -36	0,241	10.34
	Solar	21,378	. 0		21,378	8.41	*	29,18	8	23.77 *		0	0	0.00
Glass	Cond ·	5,608	. 0		5,608			5,13	0	4.18 *	-28,0	15 -28	3,015	9.58
Wall C	ond	19,751	2,412		22,162			21,31	1	17.35 *	-48,2	96 -53	3,384	18.25
Partit		1,333	,			0.52		1,33	3	1.09 *	-4,7	97 -	4,797	1.64
	d Floor					0.00		•		0.00 *		0	0	0.00
Infilt		73,569				28.93		42,04		34.24 *		34 -176		
		121,638				69.58		99,01		80.63 *		41 -292		
Internal			,		,			.,		*			•	
Lights		17,758	0		17,758	6.98	*	17,20	9	14.01 *		0	0	0.00
People		7,913	0			3.11		3,08		2.51 *		0	0	0.00
Misc		0	0	0	0					0.00 *		0	0	0.00
	tal==>	25,670	0	0	25,670			20,29		16.53 *		0	0	0.00
Ceiling	Load	9,390	-9.390			0.00		5,98	1	4.87 *		98	0	0.00
Outside (	Air	9,390 0	0	0	42,955			5,98	0	0.00 *	Í		0	0.00
Sup. Fan	Heat					4.33				0.00 *			Ō	0.00
Ret. Fan			7,237		7,237	2.85	*			0.00 *			0	0.00
Duct Hea	t Pkup		0		0	0.00	*			0.00 *			0	0.00
OV/UNDR :	Sizing	-2,489			-2,489	-0.98	*	-2,48	9	-2.03 *		0	0	0.00
Exhaust	Heat		-7,027	0		-2.76				0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	*			0.00 *			0	0.00
							*			*			-	
Grand To	tal==>	154,209	46,107	0	254,274	100.00	*	122,79	9	100.00 *	-268,6	39 -29	2,571	100.00
			c00	LING COIL S	ELECTION							AREAS		
		Capacity										al Gla	ass (s	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Grain	ns	Deg F De	g F	Grains	Floor	7,882		
lain Clg	21.2	254.3	202.2	10,315	81.4 68			63.1 6	1.6	81.7		1,853		
ux Clg	0.0	0.0	0.0	0			.0		0.0	0.0	ExFlr	0		
lpt Vent	0.0	0.0	0.0	. 0	0.0	).0 0.	. 0	0.0	0.0	0.0	Roof	3,955		0 (
otals	21.2	254.3									Wall	3,560	•	403 1
	HEAT]	NG COIL SEL	ECTION		AI		fm)-	++			CHECKS	TEMPE	RATURE	S (F)
	Capaci	•	irfl Ent		Type	Cooling	1	Heating	Clg		15.0	Type	Clg	-
	(Mbl				Vent	1,547		0		Cfm/Sqft	1.31	SADB		1 125.0
lain Htg	-400	).3 4,	331 40.1	125.0	Infil	2,529		2,529	-	Cfm/Ton	486.80	Plenum	82.	
ux Htg	(	0.0	0 0.0		Supply	10,315		4,331	_	Sqft/Ton	371.98	Return	79.	
reheat	-258	3.5 10,	315 40.1	63.1	Mincfm	0		0		Btuh/Sqft	32.26	Ret/OA	81.	4 45.2
eheat	(	).0	0 0.0	0.0	Return	10,177		4,331		People	17	Runarnd	75.	0 68.0
umidif	(	).0	0 0.0		Exhaust	1,409		0	Htg		0.0	Fn MtrTl		2 0.0
pt Vent	(	0.0	0.0	0.0	Rm Exh	1,035		. 0	_	Cfm/SqFt		Fn BldTl		2 0.0
otal	-400	١ ٦			Auxil	0		0	li t a	Btuh/SqFt	-50.78	Fn Fric	t 0.0	6 0.0

System 2 Block - UNIT HEATERS

						***	*****	*****	****	****					***** HEA			*****	**
	t Time ==			•	0/0					*			)/ 0	*			: 13/ 1		
Outside	Air ==>	(	DAD8/WB	/HR:	0/ 0/	0.0	)			*	0/	ADB:	0	*		OADE	3: 4		
		Space	e Re	t. Air	Ret. A	ir		Net P	ercnt	*	Si	pace	Percnt	*	Space Pe	ak Co	oil Peak	Perc	nt
	S	ens.+Lat.		nsible					f Tot		Sens		Of Tot		Space Se		ot Sens	Of T	
Envelope		(Btuh)		(Btuh)	(Btu		(Bt		(%)			tuh)	(%)		(Btu		(Btuh)		*)
Skylit		(555)		0	(555	,,,	(50)	0	0.00		(-	0	0.00		(	Ó	0		00
Skylit		(		0				0	0.00			0	0.00			0	0		00
Roof C		i		0				0	0.00			0	0.00		-23,7	35	-53,053	13.	
Glass		ì		0				0	0.00			0	0.00			0	0		00
Glass		Ò		0				0	0.00			0	0.00		-26,7	-	-26,764		93
Wall C		ì		0				0	0.00			Ô	0.00		-74,2		-78,211	20.	
Partit		i	)	٠				0	0.00			0	0.00		-4,7		-4,797		24
	d Floor	ì	, )					0	0.00			0	0.00		',,	0	0		00
Infilt		·	)					0	0.00		**	Ō	0.00		-223,49	-	223,493	57.	
Sub To		(	, )	0				0	0.00			0	0.00		-353,0		386,318	100.	
Internal		`	,	v				•	0.00	*		•		*	550,0	i.	000,010		••
Lights		(	١	0				0	0.00	*		0	0.00	*		0	0	0.	00
People		(		v				0	0.00			0	0.00			ō	Ŏ		00
Misc		(		0		0		0	0.00			0	0.00			0	0		00
Sub To	talii	Č		0		0		Ŏ	0.00			0	0.00			0	Ö		00
Ceiling		(		0		٠		0	0.00			0	0.00		-39,20	67	0		00
Outside		(		0		0		Ö	0.00			0	0.00		0,,2,	0	0		00
Sup. Fan		,	,	v		٠		0	0.00			•	0.00			•	0		00
Ret. Fan				0				Õ	0.00				0.00		•		0		00
Duct Hea				0	•			0	0.00				0.00				0		00
OV/UNDR		(	)	٧				0	0.00			0	0.00			0	0		00
Exhaust	_	`		0		0		0	0.00			•	0.00			•	0		00
Terminal				0		0		0	0.00				0.00				0		00
TOT MILITAL	0) 2433			·		•		•		*				*				• • •	••
Grand To	tal==>	(	)	0		0		0	0.00	*		0	0.00	*	-392,3	13 -	386,318	100.	00
	T-4-1 /				LING COI			ering (	NO /WD	/un	Loss	ina DB	/WB/HR	-	Gross Tota	ARE	Glass (s	e) /e	.)
		Capacity			Coil Ai (cfm)		Deg F	Deg F					Grains			12,541	g1455 (5	(1)	,
Wai- 01-	(Tons)	(Mbh)		bh)	(CIR)		0.0	0.0		0.0	0.0	0.0	0.0		art				
Main Clg	0.0	0.0		0.0		0				0.0	0.0	0.0	0.0		xFlr	1,853			
Aux Clg	0.0	0.0		0.0		0	0.0 0.0	0.0		0.0	0.0	0.0	0.0		loof	8,614		۸	Λ
Opt Vent	0.0 0.0	0.0		0.0		v	0.0	0.0	,	0.0	V.V	0.0	0.0		all			0 385	0 6
Totals	0.0	0.0	,						•					**	all	6,759	•	303	0
	HEATING	G COIL SE	LECTION	N				-AIRFL	o₩s (d	cfm)		E	NGINEERIN	G C	HECKS	TEM	IPERATURE:	s (F)-	
	Capacity	y Coil	Airfl	Ent	Lvg		Type	Co	oling		Heating	Clg	% 0A		0.0	Typ	e Clg	Ht	g
	(Mbh)	· (c	fm)	Deg F	Deg F		Vent		0		0	Clg	Cfm/Sqft		0.00	SADB	0.	119	.2
Main Htg	-386.	3 7	,035	68.8			Infil		Ō		3,209	Clg	Cfm/Ton		0.00	Plenu	ım O.	40	.3
Aux Htg	0.0	0 .	0	0.0	0.0		Supply		0		7,035	Clg	Sqft/Ton		0.00	Retur	n 0.	68	3.0
Preheat	0.0	0	0	0.0	0.0		Mincfm		0		0	Clg	Btuh/Sqf	t	0.00	Ret/D	)A 0.	68	3.0
Reheat	0.6	0	0	0.0	0.0		Return		0		7,035	No.	People		0	Runar	nd 0.	68	1.0
Humidif	0.0		0	0.0	0.0		Exhaust		0		0	Htg	% 0A		0.0	Fn Mt	rTD 0.	0	0.0
Opt Vent	0.0	0	0	0.0	0.0		Rm Exh		0		. 0	Htg	Cfm/SqFt		0.56	Fn 81	dTD 0.	0 0	0.0
Total	-386.	3					Auxil		0		0	Htg	Btuh/SqF	t	-30.80	Fn Fr	ict 0.	0 0	1.1

System 3 Block RAD - RADIATION

		***** C			*******	******				***** HEAT		
Peaked at			Mo/Hr:				*	•	-, -	*	Mo/Hr: 13/	1
Outside A	ir ==>	0A	D8/W8/HR:	0/ 0/ 0.	0		*	OAD8:	0	* *	OAD8: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	, *	Space	Percnt	* Space Pea	k Coil Pea	k Percn
	Ser	s.+Lat.	Sensible		Total			Sensible				
Envelope I		(Btuh)	(8tuh)		(Btuh)		*	(Btuh)		•		
Skylite		0	0		0			( ,			_	0.0
Skylite		0	0		0			Č	0.00		•	0.0
Roof Cor		0	0		0			Č	0.00		0 -92	
Glass So		0	0		0			0			_	0.0
Glass Co		ō	. 0		0			0			-	
Wall Cor		0	0		0			0				
Partitio		0	•		0			Ŏ		•	_	0 0.0
Exposed		0			0			0				0.0
Infiltra		0			0	0.00		0			-	
Sub Tota		0	0		0	0.00		0			-	
Internal L		V	v		V	0.00	*	V		* 10,77	10,00	0 100.0
Lights	.0445	0	0		0	0.00		0			0	0.0
People		٥	v		0	0.00		0			0	0.0
Misc		0	0	0	٥	0.00		0			0	0 0.0
Sub Tota	11	0	۸	0	0	0.00		0			^	0.0
Ceiling Lo		٥	0	V	٥	0.00		0			0	
Outside Ai		0	٥	0	0	0.00		0			0	0.0
Sup. Fan l		U	V	V	0	0.00		U	0.00		U	0.0
Ret. Fan h			0		0	0.00			0.00			0 0.0 0 0.0
Duct Heat			0		0				0.00			0.0
OV/UNDR Si		0	V		0	0.00		0			0	0.0
Exhaust He	-	V	0	0	0			V	0.00		U	0.0
Terminal 8			0		0				0.00			0.0
I CI III I II A	ypass		V	V	V	0.00	*		0.00	•		0.0
Grand Tota	1==>	0	0	. 0	0	0.00		0	0.00	-18,83	0 -18,83	0 100.0
			c00	ITHE COTE C	ELECTION						AREAC	
	Total Ca		Sens Cap.							Gross Tota	AREAS l Glass	(sf) (%)
	(Tons)		(Mbh)	(cfm)						Floor	169	(0.)
ain Clg									.0 0.0		0	
ux Clg	0.0	0.0	0.0	0			0.0		.0 0.0	ExFlr	0	
pt Vent	0.0	0.0	0.0	0			0.0		.0 0.0	Roof	169	0
otals	0.0	0.0		·			• • •		•••	Wall	371	18
	-HEATING	COTI SELI	ECTION		AI	RELOWS (	cfm)-		ENGINEERING	CHECKS	TEMPERATU	PFS (F)
	Capacity	Coil A			Туре	Cooling			Clg % OA	0.0		lg Htg
	(Mbh)	(cfi		Deg F	Vent	0		-	Clg Cfm/Sqft	0.00		0.0 68.
ain Htg	-18.8	(01)	0 0.0	0.0	Infil	0			Clg Cfm/Ton	0.00		0.0 29.
ux Htg	0.0		0 0.0	0.0	Supply	0			Clg Sqft/Ton			0.0 29.
reheat	0.0		0 0.0		Mincfm	0			Clg Btuh/Sqfi			0.0 29.
eheat	0.0		0 0.0	0.0	Return	0			No. People	0.00		0.0 68.
umidif	0.0		0 0.0	0.0	Exhaust	0			Htg % OA	0.0		0.0 <b>6</b> 0.
Unitali	V.V											
pt Vent	0.0		0.0	0.0	Rm Exh	0		0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0 0.

BUILDING U-VALUES - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

------ 8 U I L D I N G U - V A L U E S ------

						m U-Val /hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr	71117541	Summr	Wintr			(1b/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
. 3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.137	1.040	1.086	0.200	0.317	93.8	20.92
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Buildin	g	0.144	0.000	0.000	0.000	0.162	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

------ BUILDING AREAS ------

				Floor	Total		Exposed						
			er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
. 3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	1 Total/Ave.				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zane	3 Total/Ave.			,	4,828	0	0	0	Ō	4,828	0	0	3,570
System	2 Total/Ave.				12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	. 0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				169	0	0	0	0	169	18	5	353
Buildin					20,592	3,706	0	0	0	12,738	807	8	9,883

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 - REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.162 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.221 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.27 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 16.56 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE  $\mathbf{1}_{\parallel}$  REPLACE FLUORESCENT FIXTURES

------SYSTEM LOAD PROFILE ------

## System Totals

Percent	Cool	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	1.1	4	18	-53,193	37	1,011	867.5	0	0	0.0	. 0	0
Š - 10	2.1	0	0	-106,386	17	475	1,735.0	0	0	0.0	0	0
10 - 15	3.2	5	22	-159,579	13	363	2,602.5	0	0	0.0	0	0
15 - 20	4.2	0	0	-212,772	1	15	3,470.0	0	0	0.0	0	0
20 - 25	5.3	5	19	-265,965	1	21	4,337.5	11	654	0.0	0	0
25 - 30	6.4	0	0	-319,158	0	0	5,204.9	0	0	0.0	0	0
30 - 35	7.4	10	41	-372,351	1	37	6,072.4	0	0	0.0	0	0
35 - 40	8.5	5	19	-425,544	29	795	6,939.9	0	0	0.0	0	0
40 - 45	9.5	16	65	-478,737	0	0	7,807.4	83	5,088	0.0	0	0
45 - 50	10.6	12	50	-531,930	0	0	8,674.9	0	0	0.0	0	0
50 - 55	11.7	4	15	-585,123	0	0	9,542.4	0	0	0.0	0	0
55 - 60	12.7	5	19	-638,316	0	0	10,409.9	5	295	0.0	0	0
60 - 65	13.8	9	38	-691,509	0	0	11,277.4	2	121	0.0	0	0
65 - 70	14.8	14	60	-744,702	0	0	12,144.9	. 0	0	0.0	0	0
70 - 75	15.9	0	0	-797,895	0	0	13,012.4	0	0	0.0	0	0
75 - 80	17.0	5	20	-851,088	0	0	13,879.9	0	0	0.0	0	0
80 - 85	18.0	5	20	-904,281	0	0	14,747.4	0	0	0.0	0	0
85 - 90	19.1	2	10	-957,474	0	0	15,614.8	0	0	0.0	0	0
90 - 95	20.1	0	0	-1,010,667	0	0	16,482.3	0	0	0.0	0	0
95 - 100	21.2	0	0	-1,063,860	0	0	17,349.8	0	0	0.0	0	- 0
Hours Off	0.0	0	8,344	0	0	6,043	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

Temperature						Zone Number	
Range (F)	1	2	1	3	2		Service Servic
Max. Temp.	82.7	82.8	94.1	92.4	89.7		4
Mo./Hr.	7 21	7 20	8 21	8 19	8 21		
Day Type	4	4	. 1	1	1		
						Number of Hours	
Above 100	0	0	0	0	0		
95 - 100	0	0	0	0	0		
90 - 95	0	0	1,320	831	0		
85 - 90	0			1,167	1,292		
80 - 85	337	301	560		1,044		*
75 - 80	2,300	1,955	438				
70 - 75		1,049	663	943	488		
65 - 70	680			1,909	1,685	•	'
60 - 65	291			1,638			
55 - 60	1,101	641	571	529	986		
50 - 55	670	832	672	600	1,270		
Below 50	2,598	3,496	0	0	0		
Min. Temp.	34.6	29.9	54.9	55.0	54.9		
Mo./Hr.	2 10				2 4		
Day Type	5	5	3	3	3		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

------ MONTHLY ENERGY CONSUMPTION ------

	ELEC	DEMAND		
	Off Peak	On Peak	OIL	WATER
Month	(kWh)	(kW)	(Therm)	(1000 Gl)
Jan	3,751	17	748	0
Feb	3,392	17	692	0
March	3,913	17	598	0
April	3,108	17	233	0
Mày	3,760	18	0	0
June	8,516	81	0	0
July	14,536	96	0	0
Aug	8,301	83	0	0
Sept	3,419	69	0	0
Oct	3,388	17	111	0
Nov	3,312	17	404	0
Dec	3,552	17	645	0
Total	62,948	96	3,431	2

Building Energy Consumption = 27,096 (Btu/Sq Ft/Year)
Source Energy Consumption = 48,842 (Btu/Sq Ft/Year)

Floor Area =

20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- EQUIPMENT ENERGY CONSUMPTION-----

₽ <b>o</b> f	Equip -					Mont	thly Cons	umntian						
Num		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS ELEC PK	3006 15.6	2719 15.6	3292 15.6	2863 15.6	3149 15.6	3149 15.6	2863 15.6	3292 15.6	2863 15.6	3149 15.6	2863 15.6	2863 15.6	36,068 15.6
1	MISC LD ELEC PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
2	MISC LD GAS PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0
3	MISC LD DIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0
5	MISC LD P HOTH20 PK	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0
6	MISC LD P CHILL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	EQ1160S ELEC PK	0.0	AIR- 0 0.0	CLD COND O O.O	COMP 25 0 0.0	-35 TONS 0 0.0	4094 56.1	9850 70.2	3843 57.6	0 44.8	0.0	0.0	0.0	17,786 70.2
1	EQ5200° ELEC PK	0.0	COND O O.O	ENSER FA 0 0.0	NS 0.0	0.0	173 2.9	479 3.7	165 3.0	0 2.1	0.0	0.0	0.0	817 3.7
1	EQ5302 ELEC PK	0.0	CONT O O.O	ROLS 0 0.0	0.0	0.0	12 0.1	20 0.1	9	0 0.1	0.0	0.0	0.0	42 0.1
1	EQ4003 ELEC PK	0.0	FC C 0 0.0	ENTRIF. 0 0.0	FAN C.V. 0 0.0	612 2.8	1088 6.6	1324	993 6.6	556 6.6	0 0.0	0.0	0.0	4,573 6.6
1	EQ4003 ELEC PK	0.0	FC C 0 0.0	ENTRIF. I O O.O	FAN C.V. 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0
2	EQ4003		FC C	ENTRIF.	FAN C.V.						t with		.: 	

V 600 Trane Air Conditioning Economics By: Trane Customer Direct Service Network PAGE 12 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 PK 0.0 1 E02006 OIL FIRE TUBE STEAM 404 645 3,431 OIL 748 692 598 233 0 0 0 0 0 111 PK 1.4 1.4 1.4 1.4 0.1 0.0 0.0 0.0 0.0 1.4 1.4 1.4 1.4 HEAT WATER CIRC. PUMP C.V. 1 EQ5020 0 0 0 ELEC 194 179 71 0 0 69 130 199 1.058 215 PK 0.3 0.3 0.3 0.3 0.3 0.0 0.0 0.0 0.0 0.3 0.3 0.3 0.3 1 EQ5240 BOILER FORCED DRAFT FAN 86 457 93 0 0 0 56 ELEC 84 78 31 0 0 30 PΚ 0.1 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1 EQ5307 BOILER CONTROLS 274 0 0 0 106 198 303 1.612 ELEC 328 296 108 0 0 PK 0.5 0.5 0.5 0.5 0.5 0.0 0.0 0.0 0.0 0.5 0.5 0.5 0.5 CONDENSATE RETURN PUMP 1 EQ5061 ELEC 4 1 0 0 0 0 0 1 3 4 21 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ5406 MAKE-UP WATER 0 2 WATER 0 0 0 0 0 0 0 0 0 0 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ5040 FUEL OIL PUMP C.V.

34

0.2

0

0.0

63

0.2

97

0.2

513

0.2

104

0.2

ELEC

PK

94

0.2

87

0.2

34

0.2

0

0.2

0

0.0

0

0.0

0

0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

Sub Total

**Grand Total** 

16.25

96.3 100.00

15.6

		UTILITY PEAK CH	ECKSUM
Utility	ELECTRIC DEM	AND	
	e 96.3 ne of Peak 1	(kW) 6 (hr) 7 (mo)	
Hour 16	Month 7		
	Equipment Code Name	Utili Demai Equipment Description (kl	
Cooling Ed	quipment		
1	EQ1160S	AIR-CLD COND COMP 25-35 TONS 74	.0 76.88
Sub Total		74.	0 76.88
Sub Total		0.	.0 0.00
Air Moving	g Equipment		
1		SUMMATION OF FAN ELECTRICAL DEMAND 6	6 6.88
Sub Total		6.	6 6.88
Sub Total		0.	0.00
Miscellane	eous		
Lights Base Util Misc Equi		15. 0. 0.	0.00

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      TRACE
           600
              ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (dea) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hq) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (Btu/lbm/F) Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

14: 9:19 12/27/93 Time/Date Program was Run: Dataset Name: CB253B .TM

AIRFLOW - ALTERNATIVE 2 INFRARED HEATERS

(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	4,331	12,844	1,547	0	1,035
2	UH	0	0	7,035	0	3,035	0	0
3	RAD	0	0	0	0	170	0	0
Totals		1,547	10,315	11,366	12,844	4,752	0	1,035

CAPACITY - ALTERNATIVE 2 INFRARED HEATERS

CDesign Capacity Quantities)

System	_	Capacity	Aux. Sys. Capacity	Capacity	Cooling Totals	Main Sys. Capacity	Capacity	Preheat Capacity	Heating Reheat Capacity		Opt. Vent Capacity	Heating Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(8tuh)	(Btuh)
1	SZ	22.7	0.0	0.0	22.7	-400,260	0	-247,741	0	0	0	-400,260
2	UH	0.0	0.0	0.0	0.0	-374,200	0	0	0	0	0	-374,200
3	RAD	0.0	0.0	0.0	0.0	-18,830	0	0	0	0	0	-18,830
Totals		22.7	0.0	0.0	22.7	-793,289	0	-247,741	0	0	0	-793,289

The building peaked at hour 14 month 7 with a capacity of 21.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
INFRARED HEATERS

-----ENGINEERING CHECKS-----

			Percent		Cool:	ing		Hea	ting	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	15.00	1.31	454.6	347.4	34.54	0.55	-50.78	7,882
	Main Main	UH RAD	0.00 0.00	0.00	0.0	0.0	0.00	0.56 0.00	-29.84 -111.42	12,541 169

System 1 Peak SZ - SINGLE ZONE

******	******	***** C	COOLING COIL	. PEAK ****	*******	******	***	**** CLG	SPACE	PEAK ****	****** HE	ATING COI	L PEAK	*****
	at Time == Air ==>		Mo/Hr: DB/WB/HR:	7/14 91/ 74/105.	0					7/16 * 91 *	<b>:</b>	Mo/Hr: OADB:	-	
		Cnaca	Dat Air	Dat Air	Net	Garant	*	Ç.	200	Noront t		nak Cai	) Dook	0
	9	Space ens.+Lat.		Ret. Air Latent				Sensi		Percnt * Of Tot *			l Peak t Sens	Percnt Of Tot
Envelone	Loads				(Btuh)			(8t)		(%) *	•			(\$)
	e Solr	0 (0 (0 (1))	(bcan)	( ( C C C III)	(50011)			(00					0	0.00
-	e Cond	0	Ò	)	0				0	0.00 *		0	Ö	0.00
	Cond	. 0	52,876	•	52,876				0	0.00 *	;	0 -		10.34
Glass	Solar	21,378	0	)	21,378				188			0	0	0.00
Glass	Cond	5,608	. 0		5,608			5,	130	3.84 *		015 -	28,015	
Wall C	Cond	19,751	2,412		22,162			21,		15.96 *		296 -		
		1,333	,		1,333			1,3			-4,			1.64
Expose	d Floor	0			0		*			0.00 *			0	0.00
Infilt	ration	77,699			77,699	28.54	*	42,0	048			134 -1	76,134	
Sub To	tal==>	125,768	55,288		181,056	66.50	*		010			241 -29		100.00
Internal	Loads						*			*	-			
Lights		28,943			28,943	10.63	*	27,9	921	20.91 *		0	. 0	0.00
People		7,913	0		7,913	2.91	*	3,0		2.31 *		0	0	0.00
Misc					0				0	0.00 *		0	0	0.00
			0		36,856				009			0	0	0.00
Ceiling	Load	9,390	-9,390		0	• • • •		5,9		4.48 *		598 0	0	0.00
Outside	Air	0	-7,390	0	45.625				0	0.00 *		0	0	0.00
Sup. ran	неат				11,003								0	0.00
Ret. Fan			7,237		7,237					0.00 *			0	0.00
Duct Hea		0.400	0		0	• • • •				0.00 *			0	0.00
	Sizing	-2,489			-2,489			-2,4	489 -			0	0	0.00
	Heat			0						0.00 *			0	0.00
181 miliai	Bypass		0	0	U	0.00	*			0.00 *			U	0.00
Grand To	tal==>	169,525	46,107	. 0	272,260	100.00	•	133,5	510	100.00 *		39 -29	2,571	100.00
			coo	LING COIL S	ELECTION							ARFAS		
					Enteri									
	(Tons)				Deg F De						Floor		(0)	., (,,
Main Clg	22.7				81.4 68							•	•	
Aux Clg	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.	.0	0.0	0.0	0.0	Roof	3,955		0 0
Totals	22.7	272.3									₩all	3,560	4	103 11
	HEATING		ECTION		AI	RFLOWS (cf	fm)-		E	NGINEERING	CHECKS	TEMPE	RATURES	s (F)
=	Capacity			Lvg	Type	Cooling	Н	eating	-	% OA	15.0	Type	Clg	Htg
	(Mbh)	-	_	Deg F	Vent	1,547		0	-	Cfm/Sqft		SADB	63.1	125.0
Main Htg	-400.3			125.0				2,529		Cfm/Ton		Plenum	82.5	
Aux Htg	0.0			0.0	Supply	10,315		4,331		Sqft/Ton		Return	79.8	
Preheat	-247.7			62.1	Mincfm	. 0		0	-	Btuh/Saft		Ret/OA	81.4	
Reheat	0.0		0 0.0	0.0	Return	10,177		4,331		People	17	Runarno		
Humidif	0.0		0 0.0		Exhaust	1,409		0	_	1 % OA		Fn Mtr1		
Opt Vent	0.0		0 0.0	0.0	Rm Exh	1,035		. 0	_	Cfm/SqFt		Fn Bld1		
Total	-400.3				Auxil	0		0	Htg	Btuh/SqFt	-50.78	Fn Frio	t 0.6	<b>0.</b> 0

System 2 Block UH - UNIT HEATERS

Space   Ret. Air   Ret. Air   Net   Percnt     Space   Percnt     Space   Sp				*** (				******	*****	*****	*** *			PEAK ***				******
Space   Ret. Air   Ret. Air   Net   Percnt   #   Space   Percnt   #   Space   Sens. +Lat.   Sensible   Latent   Total   Of Tot   #   Sensible   Of Tot   #   Space   Sens   Tot Sens   Of Tot   Space   Sens   Tot Sens   Of Total   Space   Spa				0.6	•		•	0.0					-	*	_			
Sens.+Lat.   Sensible   Latent   Total   Of Tot   Sensible   Of Tot   Space   Sens   Tot Sens   Of total   Selection   Case											*			2	ŧ			
													-					Perch
vylite Solr 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0															•			Of To
Vylite Cond			(8		(8t		(Btuh	) (1	Btuh)			(8	tuh)		•	tuh)	(Btuh)	(\$
Index				0		0			0				0			0	0	0.0
lass Solar 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0 0				0		0			0							-	-	0.0
lass Cond				0		0			0				0				-53,053	14.1
				0		0			0				0				-	0.0
Intertition				0		0			0				0				-	7.1
Copyright   Copy				0		0			0				0				-78,211	20.9
				0					0				0	0.00	-4,	797	-4,797	1.2
De Total   T				0					0	0.00	*		0	0.00	t	0	0	0.0
## ## ## ## ## ## ## ## ## ## ## ## ##				0					0	0.00	*		0	0.00	-211,	374	-211,374	56.4
				0		0			0	0.00	*		0	0.00	-340,	928	-374,200	100.0
Deple		Loads									*				•			
Sec	Lights			0		0			0	0.00	*		0	0.00 *	<b>(</b>	0	0	0.0
b Total==> 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0 0	People			0					0	0.00	*		0	0.00 *		0 -	0	0.0
ing Load 0 0 0 0 0.00 * 0.00 * -39,267 0 0 0 ide Air 0 0 0 0 0 0.00 * 0.00 * -39,267 0 0 0 0 ide Air 0 0 0 0 0 0.00 * 0.00 * 0 0 0 0 0 0 0 0	Misc			0		0	(	)	0	0.00	*		0	0.00 *	:	0	. 0	0.00
Ide Air	Sub Tot	al==>		0		0	(	ì	0	0.00	*		0	0.00 *	:	0	0	0.00
Fan Heat	Ceiling L	.oad		0		0			0	0.00	*		0	0.00 *	-39,	267	0	0.00
Fan Heat	Dutside A	Air		0		0	0	)	0	0.00	*		0	0.00 *	;	0	0	0.00
Fan Heat	Sup. Fan	Heat							0	0.00	*			0.00 *			0	0.00
Heat Pkup	Ret. Fan	Heat				0			0	0.00	*			0.00 *			0	0.00
NDR Sizing	Duct Heat	Pkup				0			0	0.00	*			0.00 *			0	0.00
ust Heat 0 0 0 0 0.00 * 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0 0	OV/UNDR S	izing		0					0	0.00	*		0			0	0	0.00
inal Bypass 0 0 0 0 0.00 * 0.00 * 0.00 * 0 0.00 * 0 0 0 0	Exhaust H	leat				0	0		0	0.00	*			0.00 *			0	0.00
# Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (100	Terminal	Bypass				0	0	ı	0	0.00	*						0	0.00
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (sf) (10ns) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 12,541 Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.											*							
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (1 (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 12,541 Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Grand Tot	al==>		0		0	. 0		0	0.00	*		0	0.00 *	-380,	195 -	374,200	100.00
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (1 (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 12,541 Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.					C	00L	ING COIL	SELECTIO	N							ARE	AS	
(Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 12,541  Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.		Total	Capaci	ty	Sens Cap		Coil Airf	l En	tering	DB/WB/	HR	Leav	ing DE	3/WB/HR	Gross To	tal	Glass (s	f) (%)
Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	•	(Tons)	· (Mb	h)	(Mbh)		(cfm)										•	, (.,
Clg 0.0 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0	ain Clg	0.0		0.0	0.0		0	0.0	0.0	0	.0						•	
ent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ıx Clg						_											
Nall 6,759 385   Nall	ot Vent	0.0		0.0	0.0		0	0.0	0.0	0	.0	0.0				8,614		0 (
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % DA 0.0 Type Clg HM (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.00 SADB 0.0 117   Htg -374.2 7,035 68.8 117.7 Infil 0 3,035 Clg Cfm/Ton 0.00 Plenum 0.0 40   Htg 0.0 0 0.0 0.0 Supply 0 7,035 Clg Sqft/Ton 0.00 Return 0.0 68   at 0.0 0 0.0 Mincfm 0 0 Clg Btuh/Sqft 0.00 Ret/OA 0.0 68   t 0.0 0 0.0 Return 0 7,035 No. People 0 Runarnd 0.0 68   if 0.0 0 0.0 Return 0 7,035 No. People 0 Runarnd 0.0 68   ent 0.0 0 0.0 Retward 0 0 Htg % DA 0.0 Fn MtrTD 0.0 0	tals	0.0		0.0													;	
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % DA 0.0 Type Clg Ht (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.00 SADB 0.0 117 Htg -374.2 7,035 68.8 117.7 Infil 0 3,035 Clg Cfm/Ton 0.00 Plenum 0.0 40 Htg 0.0 0 0.0 0.0 Supply 0 7,035 Clg Sqft/Ton 0.00 Return 0.0 68 at 0.0 0 0.0 0.0 Mincfm 0 0 Clg Btuh/Sqft 0.00 Ret/OA 0.0 68 t 0.0 0 0.0 0.0 Return 0 7,035 No. People 0 Runarnd 0.0 68 if 0.0 0 0.0 0.0 Exhaust 0 0 Htg % DA 0.0 Fn MtrTD 0.0 Cent 0.0 0 0.0 REXhaust 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0.0 REXhaust 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0.0 REXhaust 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0.0 REXhaust 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 0 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 Htg Cfm/Sqft 0.56 Fn BldTD 0.0 0 0.0 Cent 0.0 0 0.0 0 0.0 REXhaust 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		HEATIN	IG COIL	SELI	ECTION				AIRFL	OWS (c	fm)-		8	NGINEERING	CHECKS	TEM	PERATURES	S (F)
(Mbh)       (cfm)       Deg F       Deg F       Vent       0       0       Clg Cfm/Sqft       0.00       SADB       0.0       117         Htg       -374.2       7,035       68.8       117.7       Infil       0       3,035       Clg Cfm/Ton       0.00       Plenum       0.0       40         Htg       0.0       0       0.0       Supply       0       7,035       Clg Sqft/Ton       0.00       Return       0.0       68         at       0.0       0       0.0       Mincfm       0       0       Clg Btuh/Sqft       0.00       Ret/OA       0.0       68         t       0.0       0       0.0       Return       0       7,035       No.       People       0       Runarnd       0.0       68         if       0.0       0       0.0       Exhaust       0       0       Htg % DA       0.0       Fn MtrTD       0.0       0         ent       0.0       0       0.0       0.0       Rm Exh       0       0       Htg Cfm/Sqft       0.56       Fn BldTD       0.0       0		Capacit	у Со	il Ai	irfl En	t	Lvg				-							
Htg       -374.2       7,035       68.8       117.7       Infil       0       3,035       Clg Cfm/Ton       0.00       Plenum       0.0       40         Htg       0.0       0       0.0       0.0       Supply       0       7,035       Clg Sqft/Ton       0.00       Return       0.0       68         at       0.0       0       0.0       Mincfm       0       0       Clg Sqft/Ton       0.00       Ret/OA       0.0       68         t       0.0       0       0.0       Return       0       7,035       No.       People       0       Runarnd       0.0       68         if       0.0       0       0.0       Exhaust       0       0       Htg % OA       0.0       Fn MtrTD       0.0       0         ent       0.0       0       0.0       Rm Exh       0       0       Htg Cfm/SqFt       0.56       Fn BldTD       0.0       0		•	-				-					-	_				-	_
Htg       0.0       0       0.0       Supply       0       7,035       Clg Sqft/Ton       0.00       Return       0.0       68         at       0.0       0       0.0       Mincfm       0       0       Clg Sqft/Ton       0.00       Return       0.0       68         t       0.0       0       0.0       Return       0       7,035       No. People       0       Runarnd       0.0       68         if       0.0       0       0.0       Exhaust       0       0       Htg % DA       0.0       Fn MtrTD       0.0       0         ent       0.0       0       0.0       Rm Exh       0       0       Htg Cfm/SqFt       0.56       Fn BldTD       0.0       0	in Htg					.8		Infil		0			_					
at 0.0 0 0.0 Mincfm 0 0 Clg 8tuh/Sqft 0.00 Ret/OA 0.0 68 t 0.0 0 0.0 0.0 Return 0 7,035 No. People 0 Runarnd 0.0 68 if 0.0 0 0.0 0.0 Exhaust 0 0 Htg % OA 0.0 Fn MtrTD 0.0 c ent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.56 Fn BldTD 0.0 0	x Htg					.0	0.0			0								
t 0.0 0 0.0 0.0 Return 0 7,035 No. People 0 Runarnd 0.0 68 if 0.0 0 0.0 0.0 Exhaust 0 0 Htg % DA 0.0 Fn MtrTD 0.0 cent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.56 Fn BldTD 0.0 0	eheat									0								
if 0.0 0 0.0 0.0 Exhaust 0 0 Htg % OA 0.0 Fn MtrTD 0.0 0 ent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.56 Fn BldTD 0.0 0	heat									0					_			
ent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.56 Fn BldTD 0.0 0	midif																	
	ot Vent																	
The state of the s	tal						J					•						
	orai	-3/4.	4					HUXII		V		U	ntg	stun/5qrt	-29.84	זז חז	1Ct 0.(	)

System 3 Block RAD - RADIATION

Peaked at Time ==>       Mo/Hr: 0/0       * Mo/Hr: 0/0       * Mo/Hr: 13         Outside Air ==>       OADB/WB/HR: 0/0/0.0       * OADB: 0       * OADB: *         *       * * *       * * * * * * * * * * * * * * * * * * *	ak Percnt ns Of Tot
* *  Space Ret. Air Ret. Air Net Percnt * Space Percnt * Space Peak Coil F  Sens.+Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot S  Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (%) * (Btuh) (%) * (Btuh) (Btuh) (Btuh)	nak Percnt ns Of Tot (%) 0 0.00 0 0.00 23 4.90
Sens.+Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot S Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (\$) * (Btuh) (\$) (Btuh) (Btuh) (Btuh)	ns Of Tot (\$) 0 0.00 0 0.00 23 4.90
Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (\$) * (Btuh) (\$) (Btuh) (Btuh)	(\$) 0 0.00 0 0.00 23 4.90
	0 0.00 0 0.00 23 4.90
Skylite Solr 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0.00 23 4.90
	23 4.90
Skylite Cond 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
1001 0011	0 0.00
Glass Solar 0 0 0 0.00 * 0 0.00 * 0	
Glass Cond 0 0 0 0.00 * 0 0.00 * -1,250 -1,	
Wall Cond 0 0 0 0.00 * 0 0.00 * -3,682 -4,	
Partition 0 0.00 * 0 0.00 * 0	0.00
Exposed Floor 0 0.00 * 0 0.00 * 0	0 0.00
Infiltration 0 0.00 * 0 0.00 * -11,840 -11,	
Sub Total==> 0 0 0 0 0 0.00 * 0 0.00 * -16,772 -18,	30 100.00
Internal Loads * *	
Lights 0 0 0 0 0.00 * 0 0.00 * 0	0.00
People 0 0.00 * 0 0.00 * 0	0.00
Misc 0 0 0 0 0 0.00 * 0 0.00 * 0	0.00
Sub Total==> 0 0 0 0 0.00 * 0 0.00 * 0	0.00
Ceiling Load 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00
Outside Air 0 0 0 0 0 0.00 * 0 0.00 * 0	0.00
Sup. Fan Heat 0 0.00 * 0.00 *	0.00
Ret. Fan Heat 0 0 0.00 * 0.00 *	0.00
Duct Heat Pkup 0 0.00 * 0.00 *	0 0.00
OV/UNDR Sizing 0 0.00 * 0 0.00 * 0	0 0.00
Exhaust Heat 0 0 0 0.00 * 0.00 *	0 0.00
Terminal Bypass 0 0 0 0.00 * 0.00 *	0.00.
* * * * * * * * * * * * * * * * * * * *	70 100 00
Grand Total==> 0 0 0 0 0.00 * 0.00 * -18,830 -18,	30 100.00
AREAS	
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glas	(sf) (%)
. (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 169	
Main Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Part 0	
Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0	
Opt Vent 0.0 · 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 169	0 0
Totals 0.0 0.0 Mall 371	18 5
HEATING COIL SELECTION	URES (F)
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type	Clg Htg
(Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.00 SADB	0.0 68.1
Main Htg -18.8 0 0.0 0.0 Infil 0 170 Clg Cfm/Ton 0.00 Plenum	0.0 29.6
Aux Htg 0.0 0 0.0 0.0 Supply 0 0 Clg Sqft/Ton 0.00 Return	0.0 29.6
Preheat 0.0 0 0.0 0.0 Mincfm 0 0 Clg Btuh/Sqft 0.00 Ret/OA	0.0 29.6
Reheat 0.0 0 0.0 0.0 Return 0 0 No. People 0 Runarnd	0.0 68.0
Humidif 0.0 0 0.0 0.0 Exhaust 0 0 Htg % DA 0.0 Fn MtrTD	0.0 0.0
Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.00 Fn BldTD	0.0 0.0
Total -18.8 Auxil 0 0 Htg Btuh/SqFt -111.42 Fn Frict	0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 2 INFRARED HEATERS

							om U-Val u/hr/sq1					Room Mass	Room Capac.
Room					Summr	Wintr	7 7 - 4	Summr	Wintr			(lb/	(Btu/
Number	Des	cription	Part.	ExFlr		Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASE	MENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECE	IVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STOR	Ε 3	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	L088	Y	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1	Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
5	BATH	ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2	Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	1	Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASE	MENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECE	IVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STOR	Ε	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	L088	Υ	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1	Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED.	WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3	Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	2	Total/Ave.	0.144	0.000	0.000	0.000	0.137	1.040	1.086	0.200	0.317	93.8	20.92
5	BATH	ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2	Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3	Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Buildin	q		0.144	0.000	0.000	0.000	0.162	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 2 INFRARED HEATERS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /#1 (%)	Net Wall Area (sqft)
	DAGENEUT		•	7 007	7 007	4 057	•		•				
1	BASEMENT	1	1	3,927	3,927	1,853	U	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	<ol> <li>Total/Ave.</li> </ol>				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	<b>35</b> 3
System	1 Total/Ave.				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.		-	,,	4,828	. 0	0	0	0	4,828	0	0	3,570
System	2 Total/Ave.				12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	1,000	0	0	0	169	18	ς.	<b>35</b> 3
Zone	2 Total/Ave.	•	•	107	169	^	0	0	٥	169	18	5	353
	•					0	0	0	٥			2	
System					169	7.701	0	0	0	169	18	3	353
Buildin	g				20,592	3,706	0	0	0	12,738	807	8	<b>9.88</b> 3.

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 INFRARED HEATERS

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.162 (Btu/Hr/Sq Ft/F)Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F)Overall Building U-Value = 0.221 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.27 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 16.56 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 INFRERED HEATERS

## System Totals

Percent	Cool	ling Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity		Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	1.1	4	19	-52,052	53	1,771	867.5	0	0	0.0	0	0
5 - 10	2.3	4	18	-104,103	14	462	1,735.0	0	0	0.0	0	0
10 - 15	3.4	4	19	-156,155	9	310	2,602.5	0	0	0.0	0	0
15 - 20	4.5	4	22	-208,206	2	62	3,470.0	0	0	0.0	0	0
20 - 25	5.7	1	4	-260,258	1	24	4,337.5	9	571	0.0	0	0
25 - 30	6.8	. 11	56	-312,309	16	528	5,204.9	0	Ō	0.0	0	0
30 - 35	7.9	1	4	-364,361	6	207	6,072.4	0	0	0.0	0	0
35 - 40	9.1	8	41	-416,412	0	0	6,939.9	0	0	0.0	0	0
40 - 45	10.2	12	61	-468,464	0	0	7,807.4	83	5,088	0.0	Ō	0
45 - 50	11.3	14	68	-520,515	0	0	8,674.9	0	0	0.0	0	0
50 - 55	12.5	1	5	-572,567	0	0	9,542.4	0	0	0.0	0	0
55 - 60	13.6	4	19	-624,618	0	0	10,409.9	5	295	0.0	0	0
60 - 65	14.7	11	53	-676,670	0	0	11,277.4	3	204	0.0	0	0
65 - 70	15.9	12	60	-728,721	0	0.	12,144.9	0	0	0.0	0	0
70 - 75	17.0	0	0	-780,773	0	0	13,012.4	0	0	0.0	0	0
75 - 80	18.2	4	20	-832,825	0	0	13,879.9	0	0	0.0	0	0
80 - 85	19.3	4	20	-884,876	0	0	14,747.4	0	0	0.0	0	0
85 - 90	20.4	2	10	-936,928	0	0	15,614.8	0	0	0.0	0	0
90 - 95	21.6	0	0	-988,979	0	0	16,482.3	0	0	0.0	. 0	0
95 - 100	22.7	0	0	-1,041,031	0	0	17,349.8	0	0	0.0	0	0
Hours Off	0.0	0	8,261	0	0	5,396	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 INFRERED HEATERS

					BUIL	DING TEMPERATURE PROFILES	
Temperature						Zone Number	
Range (F)	1	2	1	3	2		
Max. Temp.	82.8	82.8	96.1	93.7	89.7		
Mo./Hr.				8 19			
Day Type	4						
/ .//-				_	_		<i>:</i>
						Number of Hours	
Above 100	0	0	0	0	0		
95 - 100	0	0	270	0	0		
90 - 95	0			1,200	0		
85 - 90	0				1,292		
80 - 85	355	301			1,044		
75 - 80	2,322	1,955	550				
70 - 75		1,049		727	488		
65 - 70	536		1,997	491	1,685		
60 - 65	300	119	1,451	360	1,147		
55 - 60	1,194	641	552	1,517	986		
50 - 55	637	832	668	2,582	1,270		
8elow 50	2,513	3,496	0	0	0		
Min. Temp.	35.1	29.9	54.9	54.9	54.9		
Mo./Hr.	2 8	2 10	1 3	1 9	2 4		
Day Type	5	5	5	5	3		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 INRARED HEATERS

------ MONTHLY ENERGY CONSUMPTION------

	ELEC Off Peak	DEMAND On Peak	OIL	WATER
Month	(kWh)	(kW)	(Therm)	(1000 Gl)
Jan	5,656	27	765	0
Feb	5,186	27	746	0
March	5,926	27	472	0
April	4,860	27	144	0
May	5,733	28	0	0
June	11,752	97	0	0
July	16,987	110	0	0
Aug	12,060	96	0	0
Sept	5,212	81	0	0
0ct	5,332	27	76	0
Nov	5,057	27	303	0
Dec	5,500	27	703	1
Total	89,262	110	3,208	2

Building Energy Consumption = Source Energy Consumption = 60,788 (Btu/Sq Ft/Year)

30,374 (Btu/Sq Ft/Year)

Floor Area =

20,592 (Sq Ft)

2 EQ4003

FC CENTRIF. FAN C.V.

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 INRARED HEATERS

----- EQUIPMENT ENERGY CONSUMPTION------

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 INFARED HEATERS

	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2006		OIL	FIRE TUB	E STEAM									**
	OIL	765	746	472	144	0	0	0	0	0	76	303	703.	3,208
	PK	1.4	1.4	1.4	1.4	0.1	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												
	ELEC	222	220	165	59	0	0	0	0	0	61	116	244	1,088
	PK	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
1	EQ5240	BOILER FORCED DRAFT FAN												
	ELEC	96	95	71	26	0	0	0	0	0	26	50	105	470
	PK	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
1	EQ5307	BOILER CONTROLS												
	ELEC	338	336	252	90	0	0	0	0	0	93	177	372	1,658
	PK	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1	EQ5061	CONDENSATE RETURN PUMP												
	ELEC	5	4	3	1	0	0	0	0	0	1	2	5	22
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5406		MAKE	-UP WATE	R									
	WATER	0	0	0	0	0	0	0	0	0	0	0	1	2
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5040	FUEL OIL PUMP C.V.												
	ELEC	108	107	80	29	0	0	0	0	0	30	56	118	528
•	PK	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2

Grand Total

INRARED	HEATERS									
			- U T I L I	ΤY	Pξ	A K	СН	E (	KS	UM
Utility	ELECTRIC DEM	AND								
	ue 109.6 ime of Peak 1	(kW) 6 (hr) 7 (mo)								
Hour 16	Month 7									
Eqp. Ref. Num.	Equipment Code Name		Equipment D	escri	ption	l	Utili Dema (k	nd	Of	
Cooling	Equipment									
1	EQ1160S	AIR-CLD COND COMP	25-35 TONS				77	. 5	70	.75
Sub Tota	1						77	.5	70	.75
Sub Tota	1						0	.0	0	.00
Air Movi	ng Equipment						•			
1 .		SUMMATION OF FAN	ELECTRICAL D	EMAND			6	.6	6	.04
Sub Tota	1						6	.6	6	.04
Sub Tota	1						0	.0	0	.00
Miscella	neous									
Lights Base Ut: Misc Eq Sub Tota	uipment						0	.0	23 0 0 23	.00

109.6 100.00

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                ANALYSIS
       TRACE
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code: CARLISLE. Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 475 (ft) Elevation: Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) 72 (F) Summer Design Wet Bulb: Winter Design Dry Bulb: (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) 0.2444 (Btu/lbm/F) Air Specific Heat: (Btu-min./hr/cuft/F) Density-Specific Heat Prod: 1.0882 4,790.2 (Btu-min./hr/cuft) Latent Heat Factor: Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

. To September Design Simulation Period: May System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

14:21:53 12/27/93 Time/Date Program was Run:

Dataset Name: CB253B .TM

AIRFLOW - ALTERNATIVE 3 COMBINED ECOS

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	3,276	12,387	1,547	0	1,035
2	UH	0	0	5,970	0	2,620	0	0
3	RAD	0	0	0	0	128	0	0
Totals		1.547	10,315	9,245	12,387	4,295	0	1,035

CAPACITY - ALTERNATIVE 3 COMBINED ECOS

			Coo	ling			Heating							
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating		
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals		
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)		
1	SZ .	15.0	0.0	0.0	15.0	-232,997	0	-120,174	0	0	0	-232,997		
2	UH	0.0	0.0	0.0	0.0	-298,940	0	0	0	0	0	-298,940		
3	RAD	0.0	0.0	0.0	0.0	-11,650	0	0	0	0	0	-11,650		
Totals		15.0	0.0	0.0	15.0	-543,587	0	-120,174	0	0	0	-543,587		

The building peaked at hour 14 month 7 with a capacity of 14.6 tons

- ENGINEERING CHECKS - ALTERNATIVE 3 COMBINED ECOS

-----ENGINEERING CHECKS------ENGINEERING

			Percent		Cool:	ing	Heat			
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Туре	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	SZ	15.00	1.31	688.9	526.4	22.80	0.42	-29.56	7,882
.2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.48	-23.84	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-68.94	169

System 1 Peak SZ - SINGLE ZONE

******	******	*******	COOLING C	IL I	PEAK ****	******	*****	****	**** CLG	SPACE	PEAK ****	***** HEA	TING COIL	PEAK 1	******
Peaked a	t Time :	::>	Mo/Hr	7	/14			*	Mo	/Hr:	7/16 *		Mo/Hr:	13/ 1	
Outside	Air ==>		OADB/WB/HR	9	1/ 74/105.	0		*	0	AD8:	91 *		OADB:		
		Conn	n Ont .		Ret. Air	No	. nan	<b>+</b>			•		ab Cail	Daah	0
		Spac Sens.+Lat			Latent	Nei Total					Percnt *	Space Pe Space Se		Peak	Percnt Of Tot
[nya]ana	Loode	(Btul			(Btuh)	(Btuh		(%) *			(%) *				(\$)
	e Solr	( D t u i	) (01)	m)	(otali)	(Brun)		(*) (*)			0.00 *	(010	0		0.00
	e Cond		0 0 0 5,4 3 8	7				00 *		0	0.00 *		۸	0	0.00
Roof C			ν Λ ς,	77		5,437				0	0.00 *		0 -	2002	4.24
		21,10	v J,	٠ ١		21,103		74 *		,638			0	0,702	0.00
Glass		5,60	9 .	۸		5,608		12 *			5.13 *	-28 0	15 -2		
	ond	9.74	۷ (	2.4		10,279		72 *		,158	10.21 *		32 -2		
Partit		9,74 1,33	7	104		1,333		74 *			1.34 *		97 -		
	d Floor					1,550		00 *			0.00 *				0.00
	ration	54,63				54,637		41 *			34.75 *		06 -14		
		92,42		70		98,396		76 *			80.24 *		50 -21		
Internal		74,42	o J,:	10		70,370		*		, 707	0V.24 *		30 -210	7,132	100.00
Lights		17 25	2	0		17,252		60 *		000	17.20 *		0	ō	0.00
People		7,82	_			7,829		36 *			3.10 *		0	0	0.00
Misc		7,02	9 0	۸	0	7,027		00 *		,070	0.00 *		0	0	0.00
	tales	25 08	0	٥		25,080		96 *			20.29 *		0	0	0.00
Ceiling	Load	1,00	1 -1,0			23,000		00 *			0.54 *		•	0	0.00
Outside		1,00	0	0	0	40,682		64 *		0	0.00 *		0	Ö	0.00
Sup. Fan			•	٠	•	11,003				v	0.00 *		•	0	0.00
Ret. Fan			7,2	24		7,224					0.00 *			0	0.00
											0.00 *			Ö	0.00
OV/UNDR	Sizing	-1.06	5 -1,6	•		-1.065	-0.	59 *	-1	,065	-1.07 *		0	Õ	0.00
Exhaust	Heat	2,00	-1. <i>6</i>	46	0	-1.646	5 -0.	92 *	•	,	0.00 *		•	Ô	0.00
Terminal	8vpass		-,	0	0	(	) 0.	00 *			0.00 *			0	0.00
10111111111	0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			•	•	•		*			*			. •	
Grand To	tal==>	117,44	2 10,5	48	0	179,674	100.	00 *	99	,438	100.00 *	-203,1	B3 -210	0,132	100.00
			(	00L1	ING COIL SE	ELECTION							AREAS		
	Total	Capacity	Sens Cap	. (	Coil Airfl	Enteri	ing DB/	WB/HR	Leav	√ing D	B/WB/HR	Gross Tota	al Gla	ass (sf	*) (\$)
	(Tons)	(Mbh)	(Mbh)		(cfm)	Deg F De	eg F G	rains	Deg F	Deg F	Grains	Floor	7,882		
Main Clg	15.0	179.	7 141.1		10,315	78.3 6	8.6	92.1	65.2	63.5	87.6	Part	1,853	•	
Aux Clg	0.0				0		0.0	0.0		0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.	0.0		0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	3,955		0 0
Totals	15.0	179.	7						~			Wall	3,560	4	03 11
			ELECTION								ENGINEERING		TEMPE		
-	Capaci		Airfl Er			Type	Cooli		Heating		g % OA	15.0	Type	Clg	_
	(Mbh	1) - (	cfm) Deg	F	Deg F	Vent	1,5		0	Cl	g Cfm/Sqft	1.31	SADB	66.1	125.0
Main Htg	-233		-	.6	125.0		2,0		2,072		g Cfm/Ton		Plenum	75.8	
Aux Htg	0			.0	0.0		10,3		3,276		g Sqft/Ton		Return	76.1	
Preheat	-120			.5	65.2	Mincfm			0		g Btuh/Sqft		Ret/OA	78.3	
Reheat		0.0		.0	0.0	Return	10,1		3,276		. People		Runarnd	75.0	
Humidif	0			.0	0.0	Exhaust	1,3		0		g % OA		Fn MtrTi		
Opt Vent	0		0 0	.0	0.0	Rm Exh	1,0		. 0		g Cfm/SqFt		Fn BldTi		
Total	-233	3.0			•	Auxil		0	0	Ht	g Btuh/SqFt	-29.56	Fn Fric	t 0.6	0.0

System 2 Block UH - UNIT HEATERS

******	******	******	OOLING COIL	PEAK ****	*******	*******	***** CLG	SPACE	PEAK ****	***** HEAT	TING COIL PE	4K ******
Peaked a	t Time ==>		Mo/Hr:	0/0			* Mo	/Hr: (	0/0 *		Mo/Hr: 13/	1
Outside	Air ==>	DA	DB/WB/HR:	0/ 0/ 0.	.0		* O	ADB:	0 *		OAD8: 4	
		Chana	Oot Air	Dot Air	Not	Derent	* * °	<b>n</b> 200	Forent #	Snaca Da	ak Coil Pe	ak Barani
	Car	Space	Sensible	Ret. Air	Net	Percnt Of Tot		pace	Percnt * Of Tot *	•		
Frunlana		ns.+Lat.				(%)		tuh)	(%) *	*		
Envelope		(Btuh)	(Btuh)		(6,011)	0.00			0.00 *		0	
Skylit		0	0		0	0.00		0	0.00 *		0	0 0.00
Skylite Roof C		0	0		0	0.00		0	0.00 *			
Glass		0	0		0	0.00		0	0.00 *			
Glass		0		1	0	0.00		0	0.00 *		54 -26,7	
Wall C		0	. 0	i	0	0.00		0	0.00 *		59 -52,6	
Partit		۸	۷,		0	0.00		0	0.00 *			
	d Floor	۸			0	0.00		0	0.00 *	•		
Infilt		۸			0	0.00		0	0.00 *			
Sub To		0	0	ı	0	0.00		0	0.00 *		•	
Internal		v	U		U		*	V	V.VV +		270,7	10.00
Lights		0	0	ı	0	0.00		0	0.00 *		0	0 0.00
People		0	V		0	0.00		Ö	0.00 *		0	0 0.00
Misc		n	0	0	0	0.00		0	0.00 *		0	0 0.00
Sub To	taltt	0	0	_	0	0.00		0	0.00 *		0	0 0.00
Ceiling		0	0	•	0	0.00		0	0.00 *		11	0 0.0
Outside		0	0		0	0.00		0	0.00 *		0	0 0.00
Sup. Fan		V	V	·	0	0.00		٧	0.00 *		•	0 0.00
Ret. Fan			0		0	0.00			0.00 *			0 0.00
Duct Hea			0		0	0.00			0.00 *			0 0.00
OV/UNDR		0	•		0	0.00		0	0.00 *		0	0 0.00
Exhaust i	-	•	0	0	0	0.00		•	0.00 *		•	0 . 0.00
Terminal			0		0	0.00			0.00 *			0 0.0
	-7				-		*		*			
Grand To	tal==>	0	0	. 0	0	0.00	*	0	0.00 *	-314,12	298,9	100.0
			c00	LING COIL S	SELECTION	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					AREAS	
	Total Ca	apacity	Sens Cap.	Coil Airfl	. Enterin	ng DB/WB/HI	R Leav	ving DE	}/₩B/HR	Gross Tota	ıl Glass	(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grain	s Deg F	Deg F	Grains	Floor 1	2,541	
lain Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Part	1,853	
ux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
lpt Vent	0.0	0.0	0.0	0	0.0	).0 0.0	0.0	0.0	0.0	Roof	8,614	0
otals	0.0	0.0								Wall	6,759	385
	HEATING	COIL SEL	ECTION		AIF	RFLOWS (cfi	m)	8	NGINEERING	CHECKS	TEMPERAT	JRES (F)
-	Capacity			Lvg	Type	Cooling	Heating	Clg	% 0A	0.0	Type	Clg Htg
	(Mbh)	(cf	m) Deg F	Deg F	Vent	0	0	Clg	Cfm/Sqft	0.00	SADB	0.0 116.
ain Htg	-298.9	5,	970 70.3	116.4	Infil	0	2,620	Clg	Cfm/Ton	0.00	Plenum	0.0 59.1
ux Htg	0.0	•	0 0.0	0.0	Supply	0	5,970		Sqft/Ton	0.00	Return	0.0 68.6
reheat	0.0		0 0.0	0.0	Mincfm	0	0	Clg	Btuh/Sqft	0.00	Ret/OA	0.0 68.0
leheat	0.0		0 0.0	0.0	Return	0	5,970	No.	People	0	Runarnd	0.0 68.0
lumidif	0.0		0 0.0	0.0	Exhaust	0	0	-	\$ 0A	0.0	Fn MtrTD	0.0 0.0
pt Vent	0.0		0.0	0.0	Rm Exh	0	0	-	Cfm/SqFt	0.48	Fn BldTD	0.0 0.0
otal	-298.9				Auxil	0	0	Htg	Btuh/SqFt	-23.84	Fn Frict	0.0 0.

System 3 Block RAD - RADIATION

******	*****	***** C	OOLING COIL	PEAK ****	*******	******	***** CLG	SPACE	PEAK ****	****** HEAT	ING COIL PEA	K ******
Peaked a	t Time ==>		Mo/Hr:	0/0			* Mo	/Hr: (	)/0 *		Mo/Hr: 13/	1
Outside	Air ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		* 0	ADB:	0 *		OADB: 4	
		Space	Ret Air	Ret. Air	Net	Percnt	* 5	pace	Percnt *	Space Peal	Coil Pea	k Percnt
	Se	ns.+Lat.	Sensible		Total	Of Tot			Of Tot *			
Envelope		(Btuh)	(Btuh)		(Btuh)	(%)		tuh)	(%) *	•		
Skylit		0	(50011)		(00011)	0.00		0	0.00 *		-	0.00
_	e Cond	Ŏ	0		0	0.00		0	0.00 *			0.00
Roof C		0	0		0	0.00		0	0.00 *		, ) -34	
Glass		0	0		0	0.00		0	0.00 *			0 0.00
Glass		0	. 0		0	0.00		0	0.00 *			
Wall C		0	0		0	0.00		0	0.00 *			
Partit		0	V		0	0.00		0	0.00 *		•	0.00
	d Floor	0			0	0.00		0	0.00 *			
Infilt		0			0	0.00		0	0.00 *			
	tal==>	0	0		0	0.00		0	0.00 *			
Internal		V	V		V	0.00	*	v	*	10,501	. 11,00	
Lights		0	0		0	0.00		0	0.00 *	(	)	0.00
People		٥	V		0	0.00		0	0.00 *	(		0.00
Misc		0	0	0	0	0.00		0	0.00 *	,		0.00
Sub To	tales	0	0		0	0.00		0	0.00 *	Č	•	0.00
Ceiling		0	0	•	0	0.00		0	0.00 *	-769		0.00
Outside		0	0	0	0	0.00		0	0.00 *	(		0.00
Sup. Fan		•	•	•	0	0.00		-	0.00 *	·		0.00
Ret. Fan			0		0	0.00			0.00 *			0.00
Duct Hea			0		0	0.00			0.00 *			0.00
OV/UNDR		0	·		0	0.00		0	0.00 *	(	)	0.00
Exhaust			0	0	0	0.00			0.00 *			0.00
Terminal			0	0	0	0.00			0.00 *			0.00
	-71						*		*		-	
Grand To	tal==>	0	0	. 0	0	0.00	*	0	0.00 *	-11,650	-11,65	0 100.00
					ELECTION							
	Total Ca			Coil Airfl		ng DB/WB/H		-	B/WB/HR	Gross Total		(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg				Grains	Floor	169	
Main Clg		0.0		0		0.0 0.		0.0		Part	0	
Aux Clg	0.0	0.0	0.0	0			.0 0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.	.0 0.0	0.0	0.0	Roof	169	0 0
Totals	0.0	0.0								Wall	371	18 5
	HEATING	COIL SEL	ECTION		AIA	RFLOWS (ci	fm)	8	NGINEERING	CHECKS	TEMPERATU	RES (F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clo	3 % OA	0.0	Type C	lg Htg
	(Mbh)	(cfi	n) Deg F	Deg F	Vent	0	0	Clo	cfm/Sqft	0.00	SADB	0.0 68.1
Main Htg	-11.7		0.0		Infil	0	128	_	Cfm/Ton			0.0 53.6
Aux Htg	0.0		0.0	0.0	Supply	0	0		Sqft/Ton	0.00		0.0 53.6
Preheat	0.0		0 0.0	0.0	Mincfm	0	0	-	8tuh/Sqft		Ret/OA	0.0 53.6
Reheat	0.0		0 0.0	0.0	Return	0	0		People	0		0.0 68.0
Humidif	0.0		0 0.0		Exhaust	0	0		% 0A	0.0		0.0 0.0
Opt Vent	0.0		0 0.0	0.0	Rm Exh	0	. 0	_	cfm/SqFt	0.00		0.0 0.0
Total	-11.7				Auxil	0	. 0	Htg	Btuh/SqFt	-68.94	Fn Frict	0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 3 COMBINED ECOS

------ BUILDING U-VALUES-----

					Roo	m U-Val	ues				Room	Room
					(Btu	/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	114.3	24.77
3	STORE	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.056	0.317	41.6	9.33
4	LOBBY	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	88.1	19.21
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.041	1.040	1.086	0.129	0.317	102.1	23.47
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
System	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.041	1.040	1.086	0.121	0.317	103.7	23.80
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	114.3	24.77
3	STORE	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.056	0.317	41.6	9.33
4	LOBBY	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	88.1	19.21
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.041	1.040	1.086	0.129	0.317	102.1	23.47
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.061	1,040	1.086	0.129	0.317	94.9	21.14
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	1.040	1.086	0.056	0.317	180.6	38.83
Buildin	Q	0.144	0.000	0.000	0.000	0.054	1.040	1.086	0.124	0.317	99.0	22.30

BUILDING AREAS - ALTERNATIVE 3 COMBINED ECOS

------ BUILDING AREAS ------

Room		Number Dupl:	er of icate	Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	Win /Wl	Net Wall Area
Number	Description	Flr	Rm	(sqft)	(saft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	<b>35</b> 3
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	1 Total/Ave.				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	. 0	0	0	0	951	110	9	1,100
3	STORE	1	1	2.067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	0	0	0	0	4,828	0	0	3,570
System	2 Total/Ave.				12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				169	0	0	0	0	169	18	5	<b>35</b> 3
Buildin	ıg				20,592	3,706	0	0	0	12,738	807	8	9,883

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 - COMBINED ECOS

----- A S H R A E 9 0 A H A L Y S I S -----

Overall Roof U-Value = 0.054 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.193 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.118 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.33 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 13.88 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 COMBINED ECOS

## System Totals

Percent	Cool	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)		Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
				77.400	40	1 / / 1	014.0		^		^	^
0 - 5	0.7	1	4	-33,188	49	1,641	814.2	0	0	0.0	0	0
5 - 10	1.5	0	0	-66,376	14	463	1,628.5	0	0	0.0	0	U
10 - 15	2.2	7	27	-99,564	6	212	2,442.7	0	0	0.0	0	0
15 - 20	3.0	6	22	-132,752	5	177	3,256.9	0	0	0.0	0	0
20 - 25	3.7	0	0	-165,940	0	16	4,071.2	11	703	0.0	0	0
25 - 30	4.5	0	0	-199,128	0	0	4,885.4	0	0	0.0	0	0
30 - 35	5.2	4	15	-232,317	17	564	5,699.7	0	0	0.0	0	0
35 - 40	6.0	9	32	-265,505	7	245	6,513.9	83	5,088	0.0	0	0
40 - 45	6.7	20	75	-298,693	0	0	7,328.1	0	0	0.0	0	0
45 - 50	7.5	- 12	43	-331,881	0	0	8,142.4	0	0	0.0	0	0
50 - 55	8.2	0	0	-365,069	0	0	8,956.6	0	0	0.0	0	0
55 - 60	9.0	0	0	-398,257	0	0	9,770.8	0	0	0.0	0	0
60 - 65	9.7	11	39	-431,445	0	0	10,585.1	6	367	0.0	0	0
65 - 70	10.5	16	60	-464,633	0	0	11,399.3	0	0	0.0	0	0
70 - 75	11.2	0	0	-497,821	0	0	12,213.5	0	0	0.0	0	0
75 - 80	12.0	0	0	-531,009	0	0	13,027.8	0	0	0.0	0	0
80 - 85	12.7	0	0	-564,197	0	0	13,842.0	0	0	0.0	0	0
85 - 90	13.5	0	0	-597,385	0	0	14,656.2	0	0	0.0	0	0
90 - 95	14.2	5	20	-630.573	0	n	15,470.5	0	0	0.0	0	0
95 - 100	15.0	8	30	-663,761	0	0	16,284.7	۸	0	0.0	n	- 0
Hours Off	0.0	0	8,393	. 0	0	5,442	0.0	0	2,602	0.0	ő	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 COMBINED ECOS

					BUII	LDING TEMPERATURE PROFILES
Temperature						Zone Number
Range (F)	1	2	! 1	3	2	
Max. Temp.	81.2	80.9	93.4	92.2	89.5	
Mo./Hr.					8 21	
Day Type	4	4	. 2	1	1	
						Number of Hours
Above 100	0	0	0	0	0	
95 - 100	0	0	0	0	0	
90 - 95	0	0	1,618	546	0	
85 - 90	0				1,632	
80 - 85	150	100				
75 - 80		2,156	498	231	370	
70 - 75	496			641	716	,
65 - 70	1,008	514	2,107	606	1,827	
60 - 65	289		1,472	254	1,504	
55 - 60	995	316	559	1,546	884	
50 - 55	923	1,190	446	2,734	873	
Below 50	2,362	3,154	0	0	0	
Min. Temp.	36.4	30.5	54.9	54.9	54.9	
Mo./Hr.			12 10		1 12	
Day Type	5				3	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 COMBINED ECOS

------ MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND		
	Off Peak	On Peak	OIL	WATER
Month	(kWh)	(kW)	(Therm)	(1000 Gl)
Jan	3,715	17	660	0
Feb	3,483	17	678	0
March	3,877	17	385	0
April	3,058	17	127	0
May	3,611	18	0	0
June	5,317	62	0	0
July	13,195	82	0	0
Aug	7,965	72	0	0
Sept	3,283	64	0	0
0ct	3,291	17	33	0
Nov	3,244	17	246	0
Dec	3,707	17	555	1
Total	57,746	82	2,694	2

Building Energy Consumption = 22,607 (Btu/Sq Ft/Year)
Source Energy Consumption = 42,439 (Btu/Sq Ft/Year)

Floor Area = 20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION-----

	Equip -	100	enh	Man	Ann		hly Cons June	umption July	Aug	Sep	Oct	Nov	Dec	Total
Num	Code	Jan	Feb	Mar	Apr	May	June	July	ниg	Sep	oct	VUN	Dec	IULAI
0	LIGHTS			700-	00/7	74.45	7115	00/7	7000	00/3	71.10	00/7	00/7	7/ ^/0
	ELEC	3006	2719	3292	2863	3149	3149	2863	3292	2863	3149	2863	2863	36,068
	PK	15.6	15,6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													•
-	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	- 0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1160S				COMP 25									
	ELEC	0	0	0	0	0	1406	8598	3517	0	0	0	0	13,521
	PK	0.0	0.0	0.0	0.0	0.0	38.4	56.6	47.5	39.7	0.0	0.0	0.0	56.6
1	EQ5200			ENSER FA										
	ELEC	0	0	0	0	0	60	390	141	0	0	0	0	591
	PK	0.0	0.0	0.0	0.0	0.0	1.7	2.8	2.3	1.7	0.0	0.0	0.0	2.8
1	EQ5302			ROLS										
	ELEC	0	0	0	0	0		20	11	0	0	0	0	36
	PK	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ4003		FC C		FAN C.V.									
	ELEC	0	0	0	0	463	698	1324		421	0	0	0	3,909
	PK	0.0	0.0	0.0	0.0	2.1	6.6	6.6	6.6	6.6	0.0	0.0	0.0	6.6
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0.	0	0	0	0	0	. 0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ4003		FC C	ENTRIF.	FAN C.V.									

V 600 Trane Air Conditioning Economics By: Trane Customer Direct Service Network PAGE 38 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 COMBINED ECOS ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 PK 1 E02006 OIL FIRE TUBE STEAM 555 2,684 0 0 0 0 0 33 246 OIL 660 678 385 127 1.4 1.4 PΚ 1.4 1.4 1.4 1.4 0.1 0.0 0.0 0.0 0.0 1.4 1.4 HEAT WATER CIRC. PUMP C.V. 1 EQ5020 0 0 0 0 41 110 244 1.046 ELEC 205 220 169 56 0 0.3 0.0 0.0 0.0 0.3 0.3 0.3 PK 0.3 0.3 0.3 0.3 0.3 0.0 1 EQ5240 BOILER FORCED DRAFT FAN 0 0 0 18 48 105 452 89 24 0 ELEC 95 73 0 0.1 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.1 0.1 PK 0.1 0.1 1 EQ5307 BOILER CONTROLS 0 0 0 63 168 372 1,594 258 86 0 0 ELEC 313 336

0.5

0

0

0

0.2

0.0

0.0

PΚ

1 EQ5061

PK

1 EQ5406

PΚ

1 EQ5040

ELEC

PK

WATER

ELEC

0.5

0.0

0

0.0

99

0.2

0.5

0.0

0

0.0

107

0.2

0.5

CONDENSATE RETURN PUMP

3

0

0.0

FUEL OIL PUMP C.V.

82

0.2

0.0

MAKE-UP WATER

0.5

1

0.0

0.0

27

0.2

0.0

0

0

0

0.0

0.0

0.0

0.0

0

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0

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0

0.0

0.0

0.0

0.5

1

0

0.0

20

0.2

0.0

0.5

2

0

0.0

53

0.2

0.0

0.5

5

0.0

1

0.0

118

0.2

0.5

21

0.0

2

0.0

507

0.2

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 COMBINED ECOS

 UTILITY	PEAK	C H E C K S U M S

## Utility ELECTRIC DEMAND

Peak Value 81.8 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

11001 14 11011011 7				
Eqp. Ref. Equipme Num. Code Na Cooling Equipment		Utility Demand (kW)	Percnt Of Tot (%)	
1 EQ116	OS AIR-CLD COND COMP 25-35 TONS	59.5	72,77	
Sub Total		59.5	72.77	
Sub Total		0.0	0.00	
Air Moving Equipme	nt			
1	SUMMATION OF FAN ELECTRICAL DEMAND	6.6	8.10	
Sub Total		6.6	8.10	
Sub Total		0.0	0.00	
Miscellaneous				
Lights Base Utilities Misc Equipment Sub Total		15.6 0.0 0.0 15.6	19.13 0.00 0.00 19.13	
Grand Total		81.8	100.00	

Building 259

Trace Input File

```
CONTENTS OF : E:\CB259.TM
LINE # -----
   1
       J08 - 1
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 259
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
  12
       19/1/BASE BUILDING
       20/1/1/LIVING ROOM/483/1/1/.83/.39/10.5
  13
       20/2/1/MASTER BEDROOM/356/1/1/.83/.39/10.5
  14
       20/3/1/BEDROOM NO. 1/219/1/1/.83/.39/10.5
  15
       20/4/1/BEDROOM NO. 2/219/1/1/.83/.39/10.5
  16
       20/5/2/VESTIBULE/26/1/1/.83/.39/10.5
  17
       20/6/2/POWDER ROOM/26/1/1/.83/.39/10.5
  18
       20/7/2/KITCHEN, HALLWAY/140/1/1/.83/.39/10.5
  19
  20
       20/8/2/DINING ROOM/241/1/1/.83/.39/10.5
  21
       20/9/2/MAIN HALLWAY/210/1/1/.83/.39/10.5
       20/10/2/BATH NO. 2/53/1/1/.83/.39/10.5
  22
       20/11/2/BATH NO. 1/47/1/1/.83/.39/10.5
  23
       21/M///CBLQTX///CBLQTX
  24
  25
       22/2/1/YES////186
  26
       22/3/1/YES////186
  27
       22/4/1/YES////186
  28
       22/10/1/YES////186
  29
       22/11/1/YES////186
  30
       24/1/1/16/9.7//172/330
  31
       24/1/2/30/9.7//172/60
  32
       24/1/3/16/9.7//172/150
       24/2/1/9/9.5//172/150
  33
       24/2/2/19/9.5//172/240
  34
  35
       24/2/3/18/9.5//172/330
  36
       24/3/1/15/9.5//172/330
       24/3/2/14/9.5//172/60
  37
  38
       24/4/1/14/9.5//172/60
       24/4/2/15/9.5//172/150
  39
       24/5/1/5/9.5//172/150
  40
       24/5/2/5/9.5//172/240
  41
       24/6/1/5/9.5//172/60
 42
       24/6/2/5/9.5//172/150
  43
       24/7/1/7/9.5//172/150
  44
       24/7/2/10/9.5//172/240
  45
  46
       24/8/1/13/9.5//172/240
  47
       24/8/2/18/9.5//172/330
       24/9/1/6/9.7//172/240
  48
       24/9/2/7/9.7//172/330
  49
       24/9/3/7/9.7//172/150
  50
       24/10/1/6/9.5//172/240
  51
  52
       24/10/2/7/9.5//172/330
       24/11/1/6/9.5//172/150
  53
       25/1/1/5/2.5/2/.55/.57
  54
       25/1/2/4.25/2.3/2/.55/.57
  55
       25/1/3/5/2.5/2/.55/.57
  56
  57
       25/2/1/4.5/2.5/1/.55/.57
       25/2/2/4/2.5/2/.55/.57
  58
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CONTENTS OF : E:\CB259.TM
LINE #
 59
       25/2/3/4.5/2.5/2/.55/.57
 60
       25/3/1/4/2.5/2/.55/.57
 61
       25/3/2/4.5/2.5/1/.55/.57
 62
       25/4/1/4.5/2.5/1/.55/.57
 63
       25/4/2/4/2.5/2/.55/.57
 64
       25/5/1/3/2/1/.55/.57
 65
       25/6/1/3/2/1/.55/.57
 66
       25/7/1/6/2.25/1/.55/.57
 67
       25/7/2/3.5/1.5/2/.55/.57
 68
       25/8/1/5/2.5/1/.55/.57
 69
       25/8/2/5/2.5/2/.55/.57
 70
       25/9/2/3.5/1/1/.55/.57
 71
       25/10/2/4/2.5/1/.55/.57
 72
       25/11/1/4.5/2.5/1/.55/.57
 73
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF/OFF
 74
       27/M/505/SF-PERS/230/190/.5/WATT-SF/INCAND
 75
       29/1////.27/CFM-SF/.27/CFM-SF
 76
       29/2////.27/CFM-SF/.27/CFM-SF
 77
       29/3////.27/CFM-SF/.27/CFM-SF
 78
       29/4////.27/CFM-SF/.27/CFM-SF
 79
       29/5//////.27/CFM-SF
 80
       29/6//////.27/CFM-SF
 81
       29/7//////.27/CFM-SF
       29/8//////.27/CFM-SF
 82
 83
       29/9/////.27/CFM-SF
 84
       29/10//////.27/CFM-SF
 85
      29/11/////.27/CFM-SF
       SYSTEM - 1
 86
       39/1/BASE BUILDING
 87
 88
       40/1/PTAC
       41/1/1/1
 89
       42/1/.2
 90
 91
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
      40/2/RAD
 92
      41/2/1/2
 93
      45/2/OFF/OFF/OFF/OFF/CBLOHTG/OFF/OFF/OFF/OFF
 94
 95
      EQUIPMENT - 1
 96
      59/1/CARLISLE///BASE BUILDING
 97
      60/1/1/PKPLANT/1/1
      62/1/EQ1161/4
 98
      65/1/1//2/2
 99
100
      67/1/EQ2005/1
      69/1/EQ4003
101
102
      LOAD - 2
103
      19/2/WALL & ROOF INSULATION
      20/1/1/LIVING ROOM/483/1/1/.83/.39/10.5
104
      20/2/1/MASTER BEDROOM/356/1/1/.83/.39/10.5
105
      20/3/1/BEDROOM NO. 1/219/1/1/.83/.39/10.5
106
      20/4/1/BEDROOM NO. 2/219/1/1/.83/.39/10.5
107
108
      20/5/2/VESTIBULE/26/1/1/.83/.39/10.5
      20/6/2/POWDER ROOM/26/1/1/.83/.39/10.5
109
      20/7/2/KITCHEN, HALLWAY/140/1/1/.83/.39/10.5
110
      20/8/2/DINING ROOM/241/1/1/.83/.39/10.5
111
112
      20/9/2/MAIN HALLWAY/210/1/1/.83/.39/10.5
113
      20/10/2/BATH NO. 2/53/1/1/.83/.39/10.5
      20/11/2/BATH NO. 1/47/1/1/.83/.39/10.5
114
115
      21/M///CBLQTX///CBLQTX
116
      22/2/1/YES////185
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CONTENTS OF : E:\CB259.TM
LINE #
117
       22/3/1/YES////185
       22/4/1/YES////185
118
119
       22/10/1/YES////185
120
       22/11/1/YES////185
121
       24/1/1/16/9.7//179/330
122
       24/1/2/30/9.7//179/60
123
       24/1/3/16/9.7//179/150
124
       24/2/1/9/9.5//179/150
       24/2/2/19/9.5//179/240
125
       24/2/3/18/9.5//179/330
126
127
       24/3/1/15/9.5//179/330
128
       24/3/2/14/9.5//179/60
129
       24/4/1/14/9.5//179/60
130
       24/4/2/15/9.5//179/150
131
       24/5/1/5/9.5//179/150
132
       24/5/2/5/9.5//179/240
133
      24/6/1/5/9.5//179/60
134
      24/6/2/5/9.5//179/150
135
      24/7/1/7/9.5//179/150
      24/7/2/10/9.5//179/240
136
137
      24/8/1/13/9.5//179/240
138
      24/8/2/18/9.5//179/330
139
      24/9/1/6/9.7//179/240
140
      24/9/2/7/9.7//179/330
      24/9/3/7/9.7//179/150
141
142
      24/10/1/6/9.5//179/240
143
      24/10/2/7/9.5//179/330
144
      24/11/1/6/9.5//179/150
145
      25/1/1/5/2.5/2/.55/.57
146
      25/1/2/4.25/2.3/2/.55/.57
147
      25/1/3/5/2.5/2/.55/.57
148
      25/2/1/4.5/2.5/1/.55/.57
149
      25/2/2/4/2.5/2/.55/.57
      25/2/3/4.5/2.5/2/.55/.57
150
151
      25/3/1/4/2.5/2/.55/.57
152
      25/3/2/4.5/2.5/1/.55/.57
153
      25/4/1/4.5/2.5/1/.55/.57
      25/4/2/4/2.5/2/.55/.57
154
155
      25/5/1/3/2/1/.55/.57
156
      25/6/1/3/2/1/.55/.57
157
      25/7/1/6/2.25/1/.55/.57
158
      25/7/2/3.5/1.5/2/.55/.57
159
      25/8/1/5/2.5/1/.55/.57
160
      25/8/2/5/2.5/2/.55/.57
161
      25/9/2/3.5/1/1/.55/.57
162
      25/10/2/4/2.5/1/.55/.57
163
      25/11/1/4.5/2.5/1/.55/.57
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF
164
      27/M/505/SF-PERS/230/190/.5/WATT-SF/INCAND
165
      29/1////.23/CFM-SF/.23/CFM-SF
166
      29/2////.23/CFM-SF/.23/CFM-SF
167
168
      29/3////.23/CFM-SF/.23/CFM-SF
169
      29/4////.23/CFM-SF/.23/CFM-SF
170
      29/5//////.23/CFM-SF
171
      29/6//////.23/CFM-SF
      29/7/////.23/CFM-SF
172
173
      29/8/////.23/CFM-SF
      29/9//////.23/CFM-SF
174
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CONTENTS OF : E:\CB259.TM
LINE #
 175
       29/10//////.23/CFM-SF
 176
       29/11/////.23/CFM-SF
 177
       SYSTEM - 2
 178
       39/2/WALL & ROOF INSULATION
 179
       40/1/PTAC
180
       41/1/1/1
181
       42/1/.2
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
182
183
       40/2/RAD
184
       41/2/1/2
       45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
185
186
       EQUIPMENT - 2
187
       59/2/CARLISLE///WALL & ROOF INSULATION
188
       60/1/1/PKPLANT/1/1
       62/1/EQ1161/4
189
190
       65/1/1//2/2
191
       67/1/EQ2005/1
192
       69/1/EQ4003
193
       LOAD - 3
194
       19/3/WEATHERSTRIP & CAULKING
       20/1/1/LIVING ROOM/483/1/1/.83/.39/10.5
195
196
       20/2/1/MASTER BEDROOM/356/1/1/.83/.39/10.5
197
       20/3/1/BEDROOM NO. 1/219/1/1/.83/.39/10.5
198
       20/4/1/BEDROOM NO. 2/219/1/1/.83/.39/10.5
199
       20/5/2/VESTIBULE/26/1/1/.83/.39/10.5
200
       20/6/2/POWDER ROOM/26/1/1/.83/.39/10.5
201
       20/7/2/KITCHEN, HALLWAY/140/1/1/.83/.39/10.5
202
       20/8/2/DINING ROOM/241/1/1/.83/.39/10.5
203
       20/9/2/MAIN HALLWAY/210/1/1/.83/.39/10.5
204
       20/10/2/BATH NO. 2/53/1/1/.83/.39/10.5
      20/11/2/BATH NO. 1/47/1/1/.83/.39/10.5
205
206
      21/M///CBLQTX///CBLQTX
207
      22/2/1/YES////186
      22/3/1/YES////186
208
209
      22/4/1/YES////186
210
      22/10/1/YES////186
      22/11/1/YES////186
211
212
      24/1/1/16/9.7//172/330
213
      24/1/2/30/9.7//172/60
214
      24/1/3/16/9.7//172/150
215
      24/2/1/9/9.5//172/150
216
      24/2/2/19/9.5//172/240
217
      24/2/3/18/9.5//172/330
218
      24/3/1/15/9.5//172/330
219
      24/3/2/14/9.5//172/60
220
      24/4/1/14/9.5//172/60
221
      24/4/2/15/9.5//172/150
222
      24/5/1/5/9.5//172/150
      24/5/2/5/9.5//172/240
223
224
      24/6/1/5/9.5//172/60
      24/6/2/5/9.5//172/150
225
226
      24/7/1/7/9.5//172/150
227
      24/7/2/10/9.5//172/240
228
      24/8/1/13/9.5//172/240
229
      24/8/2/18/9.5//172/330
230
      24/9/1/6/9.7//172/240
231
      24/9/2/7/9.7//172/330
232
      24/9/3/7/9.7//172/150
```

```
CONTENTS OF : E:\CB259.TM
LINE #
233
       24/10/1/6/9.5//172/240
       24/10/2/7/9.5//172/330
234
       24/11/1/6/9.5//172/150
235
       25/1/1/5/2.5/2/.55/.57
236
237
       25/1/2/4.25/2.3/2/.55/.57
238
       25/1/3/5/2.5/2/.55/.57
239
       25/2/1/4.5/2.5/1/.55/.57
240
       25/2/2/4/2.5/2/.55/.57
       25/2/3/4.5/2.5/2/.55/.57
241
242
      25/3/1/4/2.5/2/.55/.57
243
      25/3/2/4.5/2.5/1/.55/.57
244
       25/4/1/4.5/2.5/1/.55/.57
245
       25/4/2/4/2.5/2/.55/.57
246
      25/5/1/3/2/1/.55/.57
247
      25/6/1/3/2/1/.55/.57
248
      25/7/1/6/2.25/1/.55/.57
       25/7/2/3.5/1.5/2/.55/.57
249
250
      25/8/1/5/2.5/1/.55/.57
251
       25/8/2/5/2.5/2/.55/.57
252
      25/9/2/3.5/1/1/.55/.57
253
      25/10/2/4/2.5/1/.55/.57
      25/11/1/4.5/2.5/1/.55/.57
254
255
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF
      27/M/505/SF-PERS/230/190/.5/WATT-SF/INCAND
256
      29/1////.22/CFM-SF/.22/CFM-SF
257
258
      29/2////.22/CFM-SF/.22/CFM-SF
259
      29/3////.22/CFM-SF/.22/CFM-SF
260
      29/4////.22/CFM-SF/.22/CFM-SF
261
      29/5//////.22/CFM-SF
262
      29/6//////.22/CFM-SF
263
      29/7/////.22/CFM-SF
264
      29/8/////.22/CFM-SF
265
      29/9/////.22/CFM-SF
      29/10//////.22/CFM-SF
266
      29/11//////.22/CFM-SF
267
      SYSTEM - 3
268
269
      39/3/WEATHERSTRIP & CAULKING
270
      40/1/PTAC
271
      41/1/1/1
272
      42/1/.2
      45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
273
274
      40/2/RAD
      41/2/1/2
275
      45/2/OFF/OFF/OFF/OFF/CBLOHTG/OFF/OFF/OFF/OFF
276
      EQUIPMENT - 3
277
278
      59/3/CARLISLE///WEATHERSTRIP & CAULKING
279
      60/1/1/PKPLANT/1/1
      62/1/EQ1161/4
280
      65/1/1//2/2
281
282
      67/1/EQ2005/1
      69/1/EQ4003
283
284
      LOAD - 4
285
      19/4/COMBINED ECOS
      20/1/1/LIVING ROOM/483/1/1/.83/.39/10.5
286
      20/2/1/MASTER BEDROOM/356/1/1/.83/.39/10.5
287
      20/3/1/BEDROOM NO. 1/219/1/1/.83/.39/10.5
288
      20/4/1/BEDROOM NO. 2/219/1/1/.83/.39/10.5
289
290
      20/5/2/VESTIBULE/26/1/1/.83/.39/10.5
```

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CONTENTS OF : E:\CB259.TM
LINE #
 291
       20/6/2/POWDER ROOM/26/1/1/.83/.39/10.5
 292
       20/7/2/KITCHEN, HALLWAY/140/1/1/.83/.39/10.5
293
       20/8/2/DINING ROOM/241/1/1/.83/.39/10.5
294
       20/9/2/MAIN HALLWAY/210/1/1/.83/.39/10.5
295
       20/10/2/BATH NO. 2/53/1/1/.83/.39/10.5
 296
       20/11/2/BATH NO. 1/47/1/1/.83/.39/10.5
297
       21/M///CBLQTX///CBLQTX
298
       22/2/1/YES////185
299
       22/3/1/YES////185
300
       22/4/1/YES////185
301
       22/10/1/YES////185
       22/11/1/YES////185
302
303
       24/1/1/16/9.7//179/330
304
       24/1/2/30/9.7//179/60
       24/1/3/16/9.7//179/150
305
306
       24/2/1/9/9.5//179/150
307
       24/2/2/19/9.5//179/240
308
       24/2/3/18/9.5//179/330
309
       24/3/1/15/9.5//179/330
310
       24/3/2/14/9.5//179/60
311
       24/4/1/14/9.5//179/60
312
       24/4/2/15/9.5//179/150
313
       24/5/1/5/9.5//179/150
314
       24/5/2/5/9.5//179/240
315
       24/6/1/5/9.5//179/60
316
       24/6/2/5/9.5//179/150
317
       24/7/1/7/9.5//179/150
318
      24/7/2/10/9.5//179/240
319
      24/8/1/13/9.5//179/240
320
      24/8/2/18/9.5//179/330
321
      24/9/1/6/9.7//179/240
322
      24/9/2/7/9.7//179/330
323
      24/9/3/7/9.7//179/150
      24/10/1/6/9.5//179/240
324
325
      24/10/2/7/9.5//179/330
326
      24/11/1/6/9.5//179/150
327
      25/1/1/5/2.5/2/.55/.57
328
      25/1/2/4.25/2.3/2/.55/.57
329
      25/1/3/5/2.5/2/.55/.57
330
      25/2/1/4.5/2.5/1/.55/.57
331
      25/2/2/4/2.5/2/.55/.57
      25/2/3/4.5/2.5/2/.55/.57
332
333
      25/3/1/4/2.5/2/.55/.57
      25/3/2/4.5/2.5/1/.55/.57
334
      25/4/1/4.5/2.5/1/.55/.57
335
      25/4/2/4/2.5/2/.55/.57
336
337
      25/5/1/3/2/1/.55/.57
338
      25/6/1/3/2/1/.55/.57
339
      25/7/1/6/2.25/1/.55/.57
      25/7/2/3.5/1.5/2/.55/.57
340
341
      25/8/1/5/2.5/1/.55/.57
342
      25/8/2/5/2.5/2/.55/.57
343
      25/9/2/3.5/1/1/.55/.57
344
      25/10/2/4/2.5/1/.55/.57
345
      25/11/1/4.5/2.5/1/.55/.57
346
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF
347
      27/M/505/SF-PERS/230/190/.5/WATT-SF/INCAND
```

29/1////.18/CFM-SF/.18/CFM-SF

348

```
CONTENTS OF : E:\CB259.TM
LINE #
      29/2////.18/CFM-SF/.18/CFM-SF
349
      29/3////.18/CFM-SF/.18/CFM-SF
350
      29/4////.18/CFM-SF/.18/CFM-SF
351
352
      29/5//////.18/CFM-SF
353
      29/6/////.18/CFM-SF
      29/7/////.18/CFM-SF
354
355
      29/8/////.18/CFM-SF
356
      29/9/////.18/CFM-SF
      29/10/////.18/CFM-SF
357
      29/11/////.18/CFM-SF
358
359
      SYSTEM - 4
360
      39/4/COMBINED ECOS
       40/1/PTAC
361
362
      41/1/1/1
363
      42/1/.2
      45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
364
365
      40/2/RAD
       41/2/1/2
366
       45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
367
      EQUIPMENT - 4
368
369
      59/4/CARLISLE///COMBINED ECOS
370
      60/1/1/PKPLANT/1/1
      62/1/EQ1161/4
371
      65/1/1//2/2
372
      67/1/EQ2005/1
373
374
      69/1/EQ4003
```

******** ** TRACE 600 ANALYSIS ** ** ** ** ************************* 

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft)

Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10:38:53 2/ 3/94

Dataset Name: CB253C .TM AIRFLOW - ALTERNATIVE 1
BASE BUILDING

		******		Auxil.	Room			
System Number	-	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,547	10,315	4,331	12,844	1,547	0	1,035
2	UH	0	0	7,039	0	3,209	0	0
. 3	RAD	0	0	0	0	170	0	0
Totals		1,547	10,315	11,370	12,844	4,926	0	1,035

CAPACITY - ALTERNATIVE 1
BASE BUILDING

------ Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif, Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Totals (Btuh) Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 22.7 0.0 0.0 22.7 -400,260 0 -247,741 0 0 -400,260 0 0 0 2 UH 0.0 0.0 0.0 0.0 -387,302 0 -387,302 0 -18,830 3 RAD 0.0 0.0 0.0 0.0 -18,830 0 0 0 Totals 22.7 0.0 0.0 22.7 -806,392 0 0 -247,741 -806,392

The building peaked at hour 14 month 7 with a capacity of 21.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

				Percent		Cool:	ing		Hea	ting	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
1	Main	SI	15.00	1.31	454.6	347.4	34.54	0.55	-50.78	7,882	
2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.56	-30.88	12,541	
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-111.42	169	

System 1 Peak SZ - SINGLE ZONE

* Mo/Hr: 7/16 * Mo/Hr: 13/ 1 * OADB: 91 * OADB: 4 Peaked at Time ==> Mo/Hr: 7/14 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OAD8: 91 Net Percnt * Space Percnt * Space Peak Coil Peak Percnt Space Ret. Air Ret. Air Net Percnt * Space Percnt * Space Peak Coil Peak Percnt Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot Sens Of Tot Sens.+Lat. Envelope Loads (8tuh) (8tuh) (8tuh) (8tuh) (%) * (8tuh) (%) * (8tuh) (\$) Exposed Floor 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 Internal Loads 11,003 4.04 * 0.00 0.00 * Sup. Fan Heat Ret. Fan Heat 7,237 7,237 2.66 * 0.00 * 0 0.00

Duct Heat Pkup 0 0 0.00 * 0.00 * 0 0.00

OV/UNDR Sizing -2,489 -2,489 -0.91 * -2,489 -1.86 * 0 0 0.00

Exhaust Heat -7,027 0 -7,027 -2.58 * 0.00 * 0.00

Terminal Bypass 0 0 0 0.00 * 0.00 * 0.00

Grand Total==> 169,525 46,107 0 272,260 100.00 * 133,510 100.00 * -268,639 -292,571 100.00 7,237 2.66 * 0.00 * 0 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 7,882

Main Clg 22.7 272.3 213.4 10,315 81.4 68.4 86.2 62.1 60.5 78.5 Part 1,853 Opt Vent 0.0 0.0 Totals 22.7 272.3 Wall 3,560 403 11 
 Wain Htg
 Composition
 System 2 Block UH - UNIT HEATERS

******	:******	******	ודמם מאדוחת	DFAY ****	*******	*******	(****	**** CIG	SPACE	DEAK ****	***** HEA	TING COTE	PEAK :	*******
	t Time ==>		Mo/Hr:				*			0/0 *		Mo/Hr: 1		
Outside			DB/WB/HR:	0/ 0/ 0.	0		*		AD8:	0 *			4	
		•		*, -,			*			*				ţata.
<i>t</i>		Space	Ret. Air	Ret. Air	N	et <b>Per</b> c	nt *	S	pace	Percnt *	Space Pe	ak Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Tot		ot *	Sens	•	Of Tot *	Space Se	ns Tot	Sens	Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btu	h) (	%) *	(8	tuh)	(%) *	(Btu	h) (8	tuh)	(\$)
Skylit		0	0			0 0.	00 *		0	0.00 *		0	0	0.00
Skylit	e Cond	0	0			0 0.	00 *		0	0.00 *		0	0	0.00
Roof C	ond	0	0			0 0.	00 *		0	0.00 *	-24,7	19 -54	,037	13.95
Glass	Solar	0	0			0 0.	* 00		0	0.00 *		0	0	0.00
Glass	Cond	0	0			0 0.	00 *		0	0.00 *	-26,7	64 -26	,764	6.91
Wall C	ond	0	0			0 0.	00 *		0	0.00 *	-74,2	57 -78	,211	20.19
Partit	ion	Õ			-	0 0.	00 *		0	0.00 *	-4,7	97 -4	,797	1.24
Expose	d Floor	0				0 0.	00 *		0	0.00 *		0	0	0.00
Infilt	ration	0				0 0.	00 *		0	0.00 *	-223,4	93 -223	,493	57.71
Sub To	tal==>	0	0			0 0.	00 *		0	0.00 *	-354,0	30 -387	,302	100.00
Internal	Loads						*			*				
Lights		0	0			0 0.	00 *		0	0.00 *		0	0	0.00
People		0				0 0.	00 *		0	0.00 *		0	0	0.00
Misc		0	0	0		0 0.	00 *		. 0	0.00 *		0	0	0.00
Sub To	tal==>	0	0	0		0 0.	00 *		0	0.00 *		0	0	0.00
Ceiling	Load	0	0			0 0.	00 *		0	0.00 *	-39,5	00	0	0.00
Outside A	Air	0	0	0		0 0.	00 *		0	0.00 *		0	0	0.00
Sup. Fan	Heat					0 0.	00 *			0.00 *			0	0.00
Ret. Fan	Heat		. 0			0 0.	00 ≭			0.00 *			0	0.00
Duct Hear			0				00 *			0.00 *			0	0.00
OV/UNDR S	Sizing	0					00 *		0	0.00 *		0	0	0.00
Exhaust 1	Heat		0	0			00 *			0.00 *			0	0.00
Terminal	Bypass		0	0		0 0.	00 *			0.00 *			0	0.00
Grand Tot	tal==>	0	. 0	0		0 0.	00 *		0	0.00 *		30 -387	,302	100.00
				ING COIL SI							A T. 4	AREAS-		(0)
	Total C		Sens Cap.			ring D8/				B/WB/HR	Gross Tot		3S (S1	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	_	Deg F G		_	_	Grains		12,541		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	1,853		
	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	EXPIR	0 (14		
Opt Vent Totals	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr Roof Wall	6,759	-	0 0 385 6
lotals	0.0	0.0									Mall	0,737		385 6
	HEATING	COIL SELE	CTION		/	AIRFLOWS	(cfm)		8	NGINEERING	CHECKS	TEMPER	TURES	s (F)
	Capacity	Coil Ai	rfl Ent	Lva	Type	Cooli	na	Heating	Clo	% OA	0.0	Type	Clg	Htg
•	(Mhh)	(cfr	) Dea F	Deg F	Vent		0	0	Clo	cfm/Sqft	0.00	SADB	0.0	119.4
Main Htg	-387.3	7,0	39 68.8	119.4	Vent Infil Supply Mincfm		0	3,209	Clg	Cfm/Sqft Cfm/Ton Sqft/Ton	0.00	Plenum		40.3
	0.0		0.0	0.0	Supply		0	7,039	Clg	Sqft/Ton	0.00	Return	0.0	
aux Htg	Λ Λ		0.0	0.0	Mincfm		0	0	019	; Btuh/Sqft	0.00	Ret/OA		68.0
Aux Htg Preheat	0.0				_		_			0		0		
Aux Htg Preheat Reheat	0.0		0.0	0.0	Return		0	7,039	NO.	People	U	Runarnd		0.84
Aux Htg Preheat Reheat Humidif	0.0 0.0 0.0		0 0.0	0.0 0.0	Return Exhaust		0	7,039 0	Htc	1 % OA	0.0	Fn MtrTD	0.0	0.0
Humidif Opt Vent	0.0 0.0 0.0 0.0 -387.3		0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.0 0.0 0.0					Htg Htg	% OA GCfm/SqFt	0.0 0.56 -30.88	Fn MtrTD Fn BldTD	0.0	0.0 0.0

System 3 Block RAD - RADIATION

* Mo/Hr: 0/0 * Mo/Hr: 13/1 Peaked at Time ==> Mo/Hr: 0/0 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 OADB: 0 * OADB: 4 Net Percht * Space Percht * Space Peak Coil Peak Percht Ret. Air Ret. Air Space Total Of Tot * Sensible Of Tot * Space Sens Tot Sens Of Tot Sensible Latent Sens.+Lat. (Btuh) (%) * (Btuh) (Btuh) (%) (Btuh) (%) * Envelope Loads (Btuh) (Btuh) (Btuh) ó 0 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0.00 * 0.00 * Skylite Solr 0 0.00 * 0 0.00 0 0.00 * 0 -923 4.90 0 0.00 * 0 0.00 0 0.00 * -1,250 -1,250 6.64 0 0.00 * -3,682 -4,816 25.58 0 0.00 * 0 0.00 * Skylite Cond 0 0.00 * Roof Cond 0 . 0.00 * Glass Solar 0.00 * Glass Cond 0 0.00 * Wall Cond Wall Cond Partition Exposed Floor 0 0 0.00 0 0.00 0 0.00 * 0 0.00 * 0 0 0.00 -11,840 -11,840 62.88 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * Infiltration 0 0.00 * -16,772 -18,830 100.00 0.00 * 0 0 Sub Total:=> Internal Loads 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00 0 0 Lights 0 0.00 0 People 0 0 0.00 * 0 0 0.00 * 0 0 0.00 * -2,058 0 0.00 * 0 0 0 0.00 * 0 0.00 * 0 0.00 Misc Sub Total==> 0 0.00 0 0 0.00 0 0.00 * 0 Ceiling Load 0 0.00 * 0 0.00 * 0.00 0 0 Outside Air 0.00 * 0.00 Sup. Fan Heat 0 0.00 * 0 0.00 * 0.00 0 Ret. Fan Heat 0.00 * 0 0.00 0 0.00 * Duct Heat Pkup 0 0 0.00 * 0 0.00 * 0.00 OV/UNDR Sizing 0 0.00 * 0.00 * 0 0 0.00 0 Exhaust Heat 0 0.00 * 0.00 0 Terminal Bypass 0.00 * 0 0.00 * -18.830 -18.830 100.00 Grand Total==> 0 0 0 0 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 169 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 Part 0.0 0.0 Main Clg 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 0.0 Aux Clq 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 169 0 0 0.0 0.0 Opt Vent 0.0 Wall 371 18 5 0.0 0.0 Totals Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg 
 Main Htg
 -18.8
 0
 0.0
 0.0
 Infil
 0
 170
 Clg Cfm/Sqft
 0.00
 SADB
 0.0
 68.1

 Aux Htg
 0.0
 0.0
 0.0
 Infil
 0
 170
 Clg Cfm/Ton
 0.00
 Plenum
 0.0
 29.6

 Aux Htg
 0.0
 0
 0.0
 Supply
 0
 0
 Clg Sqft/Ton
 0.00
 Return
 0.0
 29.6

 Preheat
 0.0
 0
 0.0
 Minofm
 0
 0
 Clg Sqft/Ton
 0.00
 Return
 0.0
 29.6

 Reheat
 0.0
 0
 0.0
 Return
 0
 0
 No. People
 0
 Runarnd
 0.0
 68.0

 Humidif
 0.0
 0
 0.0
 Exhaust
 0
 Htg % 0A
 0.0
 Fn MtrTD
 0.0
 0.0

 Opt Vent
 0.0
 0
 0.0
 Rm Exh
 0
 0
 Htg Btuh/SqFt
 -111.42
 Fn Frict
 0.0
 0.0
 BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

BUILDING U-VALUES

						m U-Val /hr/sqf	ues				Room Mass	Room Capac.
Room			P 61	Summr	Wintr		Summr	Wintr	W.11	0 '1	(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
. 2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.080	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.080	0.000	0.000	0.130	0.000	83.4	17.40
System	<pre>2 Total/Avs.</pre>	0.144	0.000	0.000	0.000	0.139	1.040	1.086	0.200	0.317	93.8	20.92
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Buildin	q	0.144	0.000	0.000	0.000	0.163	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- BUILDING AREAS -----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	-768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zona	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System	1 Total/Ave.				7,882	1,853	0	0	. 0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	768	0	0	0	0	768	275	31	605
Zone	<ol> <li>Total/Ave.</li> </ol>				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	0	0	0	0	4,828	0	0	3,570
- System	2 Total/Ave.				12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	<pre>2 Total/Ave.</pre>				169	0	0	0	0	169	18	5	353
System	3 Total/Ave.				169	0	0	0	0	169	18	5	<b>35</b> 3
Buildin	g				20,592	3,706	0	0	Ó	12,738	807	8	9,883

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

------ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.163 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.222 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.37 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 16.56 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1 AIR STRATIFICATION

## System Totals

Percent	Cooling Load		Heati	ng Load		Cooling	Airflow		Heating	Airflow		
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	1.1	4	19	-52,707	36	969	867.7	0	0	0.0	0	0
5 - 10	2.3	4	18	-105,413	14	371	1,735.4	0	0	0.0	0	0
10 - 15	3.4	4	19	-158,120	_ 15	396	2,603.0	0	0	0.0	0	. 0
15 - 20	4.5	4	22	-210,827	6	154	3,470.7	0	0	0.0	0	0
20 - 25	5.7	1	4	-263,533	1	16	4,338.4	9	571	0.0	0	0
25 - 30	6.8	11	56	-316,240	3	68	5,206.1	0	0	0.0	0	0
30 - 35	7.9	1	4	-368,946	0	8	6,073.8	0	0	0.0	0	0
35 - 40	9.1	8	41	-421,653	27	735	6,941.4	0	0	0.0	0	0
40 - 45	10.2	12	61	-474,360	0	0	7,809.1	83	5,088	0.0	0	0
45 - 50	11.3	14	68	~527,066	0	0	8,676.8	0	0	0.0	0	0
50 - 55	12.5	1	5	-579,773	0	0	9,544.5	0	0	0.0	0	0
55 - 60	13.6	4	19	-632,480	0	0	10,412.2	5	295	0.0	0	0
60 - 65	14.7	11	53	-685,186	0	0	11,279.8	3	204	0.0	0	0
65 - 70	15.9	12	60	-737,893	0	0	12,147.5	0	0	0.0	0	0
70 - 75	17.0	0	0	-790,600	0	0	13,015.2	0	0	0.0	0	. 0
75 - 80	18.2	4	20	-843,306	0	0	13,882.9	0	0	0.0	0	0
80 - 85	19.3	4	20	-896,013	0	0	14,750.6	0	0	0.0	0	0
85 - 90	20.4	2	10	-948,720	0	0	15,618.2	0	0	0.0	0	0
90 - 95	21.6	0	0	-1,001,426	0	0	16,485.9	0	0	. 0.0	0	0
95 - 100	22.7	0	0	-1,054,133	0	0	17,353.6	0	0	0.0	0	0
Hours Off	0.0	0	8,261	0	0	6,043	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 AIR STRATIFICATION

------ BUILDING TEMPERATURE PROFILES -----

Temperature Range		2	1	3	2
(F)	1	2	1	ა	2
Max. Temp.	82.8	82.8	96.1	94.1	89.7
Mo./Hr.	7 22			8 19	
Day Type	4	4	1	1	1
Ahour 100					
Above 100 95 - 100	0		-	•	0
90 - 95	. 0	•	1,498		٥
85 - 90	0			1,183	1 292
80 - 85	355				1,044
75 - 80		1,955			
70 - 75		1,049		1,832	488
65 - 70	536			1,451	
60 - 65	300			917	
55 - 60	1,194				
50 - 55	637				1,270
Below 50		3,496	0		0
Min. Temp.	35.1	29.9	54.9	55.0	54.9
Mo./Hr.	2 8				2 4
Day Type	5			4	3

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 AIR STRATIFICATION

----- MONTHLY ENERGY CONSUMPTION -----

Month -	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	OIL (Therm)	WATER (1000 Gl)
Jan	5,633	27	739	0
Feb	5,095	27	690	0
March	5,975	27	589	0
April	4,919	27	252	0
May	5,733	. 28	0	0
June	11,752	97	0	_ 0
July	16,987	110	0	0
Aug	12,060	96	0	0
Sept	5,212	81	0	0
Oct	5,391	27	165	0
Nov	5,105	27	410	0
Dec	5,345	27	630	0
Total	89,207	110	3,475	2

Building Energy Consumption = 31,662 (Btu/Sq Ft/Year)
Source Energy Consumption = 62,126 (Btu/Sq Ft/Year)

Floor Area = 20,

20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 AIR STRATIFICATION

----- EQUIPMENT ENERGY CONSUMPTION ------

Ref Num	Equip Code	Jan	 Feb	Mar	Apr	Mont May	hly Cons June	sumption July	Aug	Sep	Oct	Nov	Dec		Total
0	LIGHTS														
_	ELEC	4888	4423	5354	4655	5121	5121	4655	5354	4655	5121	4655	4655		58,659
	PK	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4		25.4
· 1	MISC LD											_			
	ELEC	0	0	0	0	_ 0	0	0	0	0	0	0	0		. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
2	MISC LD						^	۵	Δ.	٨	^	^	٨		0
	GAS	0	0	0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0 0.0	0.0	0.0		0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.V		
3	MISC LD	^	0	0	0	0	0	0	0	0	0	0	0		0
	OIL PK	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
		V.0	<b>V.</b> 0	0.0	***	***	•••								
	MISC LD			•		•		۸	^	٥	^	۸	٥		0
	P STEAM	0	0	0.0	0 0.0	0.0	0 0. <b>0</b>	0.0	0.0	0.0	0.0	0.0	0.0		0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.V	V.V	-	V.V
5	MISC LD									•	•	^	^	,	٥
	P HOTH20	0	0	0.0	0.0	0 0.0	0.0	0 <b>0</b> .0	0.0	0.0	0.0	0.0	0 0.0		0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
6	MISC LD		٥	^	۸	0	۸	0	0	0	0	0	0		0
	P CHILL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
	PK	0.0						V.0	0.0	0.0	V.V	0.0	0.10		•••
1	EQ1160S				COMP 25										80 805
	ELEC	0	0	0	0	0	5222	10468	5235	0	0	0.0	0.0		20,925
	PK	0.0	0.0	0.0	0.0	0.0	61.3	73.5	60.4	46.6	0.0	<b>V.</b> 0	0.0		73.5
1	EQ5200			DENSER FA											
	ELEC	0	0	0	0	0	222	519	231	0	0	0	0		972
	PK	0.0	0.0	0.0	0.0	0.0	3.2	4.0	3.2	2.3	0.0	0.0	0.0		4.0
1	EQ5302			TROLS											
	ELEC	0	0	0	0	0	15	20	13	0	0	0	0		48
	PK	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0		0.1
1	EQ4003				FAN C.V.		,				_	_			4 000
	ELEC	0	0	0	0	612		1324	1227	556	0	0	0		4,892
	PK	0.0	0.0	0.0	0.0	2.8	6.6	6.6	6.6	6.6	0.0	0.0	0.0		6.6
1	EQ4003		FC (		FAN C.V.								_		
•	ELEC	. 0	0	0	0	0		. 0	0	0	0	0	0		0
	PK	0.0	0.0	0.0	0.0	0.0	00	0.0	0.0	0.0	0.0	0.0	0.0		0.0
2	EQ4003		FC (	CENTRIF.	FAN C.V.										

	ane Air Co				V										V 600
ву	: Trane C	ISTOME	er Direct	Service	network										PAGE 12
EQ	UIPMENT EI	VERGY	CONSUMPT	ION - AL	TERNATIV	E 1									The wall of the same of the sa
AI	R STRATIF	CATIO	N												
Mile.			_								_				
	ELEC		0	0	0.0	0	0.0	0	0.0	0.0	0.0	0	0	0	
	PK		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1 E02006			וות	FIRE TUB	F STEAM									
	OIL		739	690	589	252	0	0	0	0	0	165	410	630	3,475
	PK	-	1.4	1.4	1.4	1.4	0.1	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4
	1 EQ5020				WATER C				_		_				
	ELEC		215	194	179	76	0	0	0	0	0	78	130	199	1,072
	PK		0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
	1 EQ5240			BOTU	ER FORCE	DRAFT	FAN								
	ELEC		93	. 84	78	33	_ 0	0	0	0	0	34	56	86	463
	PK		0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
															1
	EQ5307		700		ER CONTRO		^		•	.0	•	110	100	707	
	ELEC PK		328 0.5	296 0.5	274 0.5	116 0.5	0 0.5	0.0	0 0.0	0.0	0 0.0	119 0.5	198 0.5	303 0.5	1,634 0.5
	ŧ N		0.5	0.5	0.5	V.5	V.5	0.0	0.0	<b>v.</b> 0		0.5	0.5	0.3	V.3
	EQ5061			CONDE	ENSATE RE	ETURN PU	MP								
	ELEC		4	4	4	2	0	0	0	0	0	2	3	4	22
	PK		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	F0740/			HAVE	UD WATER										
	EQ5406 WATER		0	. 0	-UP WATER O	. 0	0	0	0	0	0	0	0	0	2
	PK		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	, N		415	V. V	V 1 V	VIV	0.0	4.4	VIV	V. 0		0.0	V. V	V.V	V.V
. 1	EQ5040			FUEL	OIL PUMP	C.V.									
	ELEC		104	94	87	37	0	0	0	0	0	38	63	97	520
	PK		0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2

## UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 AIR STRATIFICATION

UTILITY PEAK CHECKSUM	· U	T	Ι	L	I	T	Υ	Р	Ε	Α	K		Ĉ	Н	Ε	C	K	S	U	М	S	ì
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Utility	ELECTRIC	DEMAND
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Peak Value 109.6 (kW) Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	.*•	Equipment Description	Utility Demand (kW)		
Cooling	Equipment					
1	EQ1160S	AIR-CLD COND COMP	25-35 TONS	77.5	70.75	
Sub Tota	1			77.5	70.75	
Sub Tota	:1			0.0	0.00	
Air Movi	ng Equipment					
1		SUMMATION OF FAN	ELECTRICAL DEMAND	6.6	6.04	
Sub Tota	1	`		6.6	6.04	
Sub Tota	1			0.0	0.00	
Miscella	neous					
Lights Base Ut Misc Eq Sub Tota	uipment			25.4 0.0 0.0 25.4	23.21 0.00 0.00 23.21	
Grand To	tal			109.6	100.00	

** ** TRACE 600 ANALYSIS ********* 

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 253

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 . Summer Design Dry Bulb: 92 (F) 72 (F) Summer Design Wet Bulb: 4 (F) Winter Design Dry Bulb: Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 0.0742 (Lbm/cuft) Air Density: 0.2444 (Btu/1bm/F) Air Specific Heat: 1.0882 (Btu-min./hr/cuft/F) Density-Specific Heat Prod: 4.790.2 (Btu-min./hr/cuft) Latent Heat Factor: 4.4519 (Lb-min./hr/cuft) Enthalpy Factor:

Design Simulation Period: May To September System Simulation Period: January To December CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

10:55:15 2/ 3/94 Time/Date Program was Run:

Dataset Name: CB253C .TM

AIRFLOW - ALTERNATIVE 2 BASE BUILDING

System System Number Type

> 1 SZ 2 UH 3 RAD

Totals

(Design Airflow Quantities)

10,315 11,366

		Main			Auxil.	Room
Outside	Cooling	Heating	Return	Exhaust	Supply	Exhaust
Airflow						
(Cfm)						
1.547	10,315	4,331	12,844	1.547	0	1,035
0	0	7,035	0	3,209	0	0

12,844

CAPACITY - ALTERNATIVE 2 BASE BUILDING

1,547

170

4,926

1.035

		Coo	ling					Heating			
	Main Sys.	-		Cooling Totals	Main Sys. Capacity	Aux. Sys. Capacity	Preheat Capacity	Reheat Capacity	Humidif. Capacity	Opt. Vent Capacity	Heating Totals
System System Number Type	Capacity (Tons)	Capacity (Tons)	Capacity (Tons)	(Tons)	(Btuh)	(8tuh)	(Btuh)	(8tuh)	(Btuh)	(Btuh)	(Btuh)
1 SZ	22.7	0.0	0.0	22.7	-400,260	0	-247,741	0	0	0	-400,260
2 UH	0.0	0.0	0.0	0.0	-386,318	0	0	0	0	0	-386,318
3 RAD	0.0	0.0	0.0	0.0	-18,830	0	0	0	0	0	-18,830
Totals	22.7	0.0	0.0	22.7	<b>-80</b> 5,408	0	-247,741	0	0	0	-805,408

The building peaked at hour 14 month 7 with a capacity of 21.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2 BASE BUILDING

Sec.			Percent Outside Air		Cool:	ing	Hea			
System Number	Main/ Auxiliary	System Type		Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	15.00	1.31	454.6	347.4	34.54	0.55	-50.78	7,882
2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.56	-30.80	12,541
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-111.42	169

System 1 Peak SZ - SINGLE ZONE

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1 * OAD8: 4 Space Ret. Air Ret. Air Net Percnt * Space Percnt * Space Peak Coil Peak Percnt Sens.+Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot Sens Of Tot Internal Loads

Lights 28,943 0 28,943 10.63 * 27,921 20.91 * 0 0 0.00

People 7,913 7,913 2.91 * 3,088 2.31 * 0 0 0.00

Misc 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00

Sub Total==> 36,856 0 0 36,856 13.54 * 31,009 23.23 * 0 0 0.00

Ceiling Load 9,390 -9,390 0 0.00 * 5,981 4.48 * -11,398 0 0.00

Outside Air 0 0 0 45,625 16.76 * 0 0.00 * 0 0 0.00

Sup. Fan Heat 11,003 4.04 * 0.00 * 0 0.00

Ret. Fan Heat 7,237 7,237 2.66 * 0.00 * 0 0.00

Duct Heat Pkup 0 0 0.00 * 0.00 * 0 0.00

Exhaust Heat -7,027 0 -7,027 -2.58 * 0.00 * 0 0.00

Exhaust Heat -7,027 0 -7,027 -2.58 * 0.00 * 0.00

Terminal Bypass 0 0 0 272,260 100.00 * 133,510 100.00 * -268,639 -292,571 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 7,882

Main Clg 22.7 272.3 213.4 10,315 81.4 68.4 86.2 62.1 60.5 78.5 Part 1,853 Aux Clg 0.0 0.0 0.0 0.0 Opt Vent 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Exflr 0 Roof 3,955 
 Opt Vent
 0.0
 0.0

 Totals
 22.7
 272.3
 0.0 0 0.0 0.0 0.0 0.0 0.0 Wall 3,560 403 11 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 15.0 Type Clg Htg 
 Capacity (Mbh)
 Coll Airfl
 Ent
 Lvg
 Type
 Cooling
 Heating
 Cig % UR
 15.0
 Type
 Cig
 Htg

 Main Htg
 -400.3
 4,331
 40.1
 125.0
 Infil
 2,529
 2,529
 Clg Cfm/Ton
 454.64
 Plenum
 82.5
 39.8

 Aux Htg
 0.0
 0
 0.0
 0.0
 Supply
 10,315
 4,331
 Clg Sqft/Ton
 347.40
 Return
 79.8
 45.2

 Preheat
 -247.7
 10,315
 40.1
 62.1
 Mincfm
 0
 0
 Clg Btuh/Sqft
 34.54
 Ret/OA
 81.4
 45.2

 Reheat
 0.0
 0
 0.0
 Return
 10,177
 4,331
 No. People
 17
 Runarnd
 75.0
 68.0

 Humidif
 0.0
 0
 0.0
 Exhaust
 1,409
 0
 Htg % 0A
 0.0
 Fn MtrTD
 0.2
 0.0

 Opt Vent
 0.0
 0
 0.0
 Rexh
 1,035
 0
 Htg Btuh/SqFt

System 2 Block UH - UNIT HEATERS

				mmass ababababa			ن مات مات مات مات مات	+++ AIA	00405	DEAK THAT	****** IIFA	TTHE COTE	DEAK	
				PEAK *****	******	******	****		SPACE Hr: 0			Mo/Hr:	76HK 4	*****
Peaked at			Mo/Hr: (									OADB:	4	
Outside A	ir ==>	DAL	DB/WB/HR:	0/ 0/ 0.0	)		*	บค	DB:	0 *		. פעאט	4 .	
		0	0-4 4:5	Dat Air	· Not	Donon		e.	200	Doront #	Space Pe	ak Coil	Deak	Percnt
	0.	Space		Ret. Air		t Percn l Of To		Sensi	ace	Percnt * Of Tot *	•		Sens	Of Tot
		ens.+Lat.	Sensible	Latent (2+vh)	Total				uh)	(%) *			Stuh)	(\$)
Envelope 1		(Btuh)	(Btuh)	(Btuh)	(Btuh)		) *	(01		0.00 *		0	0	0.00
Skylite		0	0		0		0 *		0			0	0	0.00
Skylite		0	0		(		0 *		0	0.00 *		-	-	13.73
Roof Co		0	0		(		0 *		0	0.00 *			3,053 0	0.00
Glass S		0	0		(		0 *		0	0.00 *		0	-	
Glass C		0	0		(		0 *		0	0.00 *			5,764	6.93
Wall Co		0	0				10 *		0	0.00 *			3,211	20.25
Partiti		0					0 *		0	0.00 *			,797	1.24
Exposed	Floor	0			. (		0 *		0	0.00 *		•	0	0.00
Infiltr	ation	0			(		0 *		0	0.00 *			3,493	57.85
Sub Tot	al==>	0	0		(	0.0	0 *		0	0.00 *	-353,0	46 -38	5,318	100.00
Internal	Loads						*			*				
Lights		0	0		(	0.0	0 *		0	0.00 *		0	0	0.00
People		0			(	0.0	0 *		0	0.00 *		0	0	0.00
Misc		0	0	0	(	0.0	0 *		0	0.00 *		0	0	0.00
Sub Tot	al::>	0	0	0	(	0.0	0 *		0	0.00 *		0	0	0.00
Ceiling L		0	0		(	0.0	00 *		0	0.00 *	-39,2	67	0	0.00
Outside A		0	0	0	(	0.0	0 *		0	0.00 *		0	0	0.00
Sup. Fan					(	0.0	0 *			0.00 *			0	0.00
Ret. Fan			0		(		0 *			0.00 *			Ō	0.00
Duct Heat			0		(		0 *			0.00 *			0	0.00
OV/UNDR S		0	·		(		0 *		Ō	0.00 *		0	0	0.00
Exhaust H	_		0	0	(		0 *			0.00 *			0	0.00
Terminal			0	0	(		* 01			0.00 *			0	0.00
, CIMINAL	0) pass		·	•	`	• • • • • • • • • • • • • • • • • • • •	*			*				
Grand Tot	alzzy	0	0	0	(	0.0	0 *		0	0.00 *	-392,3	13 -38	6,318	100.00
		•	•	•	•		-				,		,	
				LING COIL SE	TLECTION							AREAS		
# P	Total			Coil Airfl		ing DB/W	IR/HR	Leav	ina DE	B/WB/HR	Gross Tot	al Gl	ass (s	f) (%)
	(Tons)		,	(cfm)						Grains		12,541	•	, , ,
Main Clo				0							Part			
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,614		0 (
Totals	0.0	0.0	4.0	v	0.0	0.0	V. 0	313	***	• • • • • • • • • • • • • • • • • • • •	Wall	6,759		385 6
101972		0.0						•				-,,		
·.	UEATTN	C COTT SEL	ECTION		A	TRELANG	(cfm)		8	ENGINEERING	CHECKS	TEMPE	RATURF	S (F)
	Capacit				Туре	Coolir		Heating		g % OA	0.0	Туре	Clg	
	(Mbh)	•			Vent	000111	0	nearing 0		g Cfm/Saft	0.00	SADB		0 119.2
Main Uta	-				Infil		0	3,209		g Cfm/Ton	0.00	Plenum	0.	
Main Htg	-386.		0.0		Supply		0	7,035		g Sqft/Ton	0.00	Return	0.	
Aux Htg	0.							7,033		g Btuh/Saft		Ret/OA	0.	
Preheat	0.		0 0.0		Minofm		0			g Blanysqil . Peaple	0.00	Runarnd		
	0.		0 0.0		Return Exhaust		0	7,035 0		g % OA	0.0	Fn MtrI		
Reheat	_			n n	► Vnallet		11		n ( (	u a UM	0.0	III II LES	υ υ.	A 0.
Reheat Humidif	0.													0 0
Reheat	0. 0. -386.	0	0 0.0		Rm Exh Auxil		0	0	Ht	g Cfm/SqFt g Btuh/SqFt	0.56	Fn BldT Fn Fric	D 0.	-

System 3 Block RAD - RADIATION

														· ·
					******	******	****				****** HEAT			***
Outside	t Time ==	:> 0A	Mo/Hr:	0/ 0/ 0.	٥		*		/Hr: ADB:	0/0 ↑ 0 *		Mo/Hr: 13/ OADB: 4		
0012108	H11/	UH	יאח / פחוים או	0/ 0/ 0.	v		*	U	. סעא	*		UNUD. 4		-
÷.		Space	Ret Air	Ret. Air	Net	Percnt	*	Si	pace	Percnt *	Space Pea	k Coil Pe	ak Per	ront
	5	Sens.+Lat.	Sensible		Total			Sens		Of Tot *	,			Tot
Envelope		(Btuh)	(Btuh)		(Btuh)	(%)		· (B		(%) *				(%)
Skylit		0	0		0	0.00		. (•	0	0.00 *		0		00.0
Skylit		0	0	)	0	0.00			0	0.00 *		0		0.00
Roof C		0	0		0	0.00			0	0.00 *		0 -9		1.90
Glass		0	0	)	0	0.00			0	0.00 *		0		0.00
Glass		0	0		0	0.00			0	0.00 *		0 -1,2		5.64
Wall C		0	0	)	0	0.00			0	0.00 *				5.58
Partit		0			. 0	0.00	*		Ō	0.00 *		0		00.0
	d Floor	0			0	0.00			0	0.00 *		0		00.0
Infilt		0			0	0.00	*		0	0.00 *		0 -11,8		2.88
Sub To	tal==>	0	0		0	0.00	*		0	0.00 *				00.0
Internal							*			*	•	,		
Lights		0	0		0	0.00	*		0	0.00 *		0	0 0	00.0
People		0			0	0.00	*		0	0.00 *		0	0 0	00.0
Misc		0	0	0	0	0.00	*		0	0.00 *		0	0 0	00.0
Sub To	tal==>	0	0	0	0	0.00	*		0	0.00 *		0	0 0	.00
Ceiling (	Load	0	0		0	0.00	*		0	0.00 *	-2,05	3	0 0	0.00
Outside (	Air	0	. 0	0	0	0.00	*		0	0.00 *		0	0 0	.00
Sup. Fan	Heat				0	0.00	*			0.00 *			0 0	00.00
Ret. Fan	Heat		0		0	0.00	*			0.00 *			0 0	00.
Duct Heat	t Pkup		0		0	0.00	*			0.00 *			0 0	00.
OV/UNDR S	Sizing	0		•	0	0.00			0	0.00 *		0	0 0	00.
Exhaust 1			0	0	0	0.00				0.00 *				00.00
Terminal	Bypass		. 0	0	0	0.00				0.00 *			0 0	0.00
							*			*				
Grand Tot	tal==>	. 0	0	0	0	0.00	*		. 0	0.00 *	-18,83	-18,8	30 100	.00
*. •				ITHE COTE C	ELECTION							40546		
	Total			Coil Airfl							Gross Tota		(sf) (	
		(Mbh)	(Mbh)	(cfm)							Floor	169	(31) (	10)
Main Clg					0.0 0						Part			
Aux Clg	0.0	0.0	0.0	Ö			.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0			.0	0.0	0.0	0.0		169	0	0
Totals	0.0	0.0	• • • • • • • • • • • • • • • • • • • •		• • • • •			***	•••	***	Wall	371	18	5
	HEATIN	IG COIL SEL	ECTION		AIR	FLOWS (c	fm)-			ENGINEERING	CHECKS	TEMPERATI	JRES (F)	
	Capacit	y Coil A	irfl Ent	Lvg	Type	Cooling	H	eating	Cl	g % OA	0.0	Type	Clg H	łtg
	(Mbh)	(cf	m) Deg F		Vent	0		0	Cl	g Cfm/Sqft	0.00	SADB	-	8.1
Main Htg	-18.	8	0 0.0	0.0	Infil	0		170		g Cfm/Ton	0.00	Plenum	0.0 2	29.6
Aux Htg	0.	0	0 0.0	0.0	Supply	0		0	Cle	g Sqft/Ton	0.00	Return	0.0 2	29.6
Preheat	0.	0	0 0.0	0.0	Mincfm	0		0	Cl	g Btuh/Sqft	0.00	Ret/OA	0.0 2	29.6
Reheat	0.	0	0.0		Return	0		0		. People	0	Runarnd	0.0 6	8.0
Humidif	0.		0 0.0		Exhaust	0		0		g % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.		0 0.0	0.0	Rm Exh	0		0		g Cfm/SqFt	0.00	Fn BldTD		0.0
Total	-18.	8			Auxil	0		0	Ht	g Btuh/SqFt	-111.42	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2
BASE BUILDING

BUILDING U-VALUES

-						m U-Val					Room	Room
					-	/hr/sqf					Mass	Capac.
Room				Summr	Wintr	- 10 D	Summr	Wintr			(1b/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	<pre>1 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	101.9	23.44
1	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	133.6	31.44
2	RECEIVING	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	110.6	24.01
3	STORE	0.000	0.000	0.000	0.000	0.214	0.000	0.000	0.289	0.317	40.3	9.07
4	LOBBY	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.269	0.317	78.9	17.36
Zone	1 Total/Ave.	0.144	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	100.3	23.13
6	MED. WAREHOUSE	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.077	0.000	0.000	0.130	0.000	83.4	17.40
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.137	1.040	1.086	0.200	0.317	93.8	20.92
5	BATH ROOMS	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.214	1.040	1.086	0.289	0.317	174.6	37.62
Buildir		0.144	0.000	0.000	0.000	0.162	1.040	1.086	0.231	0.317	97.6	22.02

BUILDING AREAS - ALTERNATIVE 2 BASE BUILDING

Room Number			er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	. 0	0	0	Ō	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	LOBBY	1	1	768	_768	. 0	Ò	0	0	768	275	31	605
Zone	<ol> <li>Total/Ave.</li> </ol>			•	7,713	1,853	0	0	0	3,786	385	12	2,804
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	353
Zone	2 Total/Ave.				169	. 0	0	0	0	169	18	5	353
System	1 Total/Ave.				7,882	1,853	0	0	0	3,955	403	11	3,157
1	BASEMENT	1	1	3,927	3,927	1,853	0	0	0	0	0	0	824
2	RECEIVING	1	1	951	951	0	0	0	0	951	110	9	1,100
3	STORE	1	1	2,067	2,067	0	0	0	0	2,067	0	0	275
4	L088Y	1	1	768	768	0	0	0	0	768	275	31	605
Zone	1 Total/Ave.				7,713	1,853	0	0	0	3,786	385	12	2,804
6	MED. WAREHOUSE	1	1	4,828	4,828	0	0	0	0	4,828	0	0	3,570
Zone	3 Total/Ave.				4,828	0	0	0	0	4,828	0	0	3,570
System	2 Total/Ave.	`			12,541	1,853	0	0	0	8,614	385	6	6,374
5	BATH ROOMS	1	1	169	169	0	0	0	0	169	18	5	<b>35</b> 3
Zone	2 Total/Ave.				169	0	0	0	0	169	18	5	353
System					169	0	0	0	0	169	18	5	<b>3</b> 53
Buildi	ng				20,592	3,706	0	0	0	12,738	807	8	9,883

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 BASE BUILDING

ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.162 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.292 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.221 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 12.27 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 16.56 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 CEILING FANS

## System Totals

Percent		ing Loa		Heatin			Cooling		Hours	 Heating Cap.	Airflow Hours	Hours
Design Load	Cap. (Ton)	Hours (%)	nours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	(%)	U0012	(Cfm)	(\$)	noul S
0 - 5	1.1	4	19	-52,657	41	1,104	867.5	0	0	0.0	0	0
5 - 10	2.3	4	18	-105,315	16	446	1,735.0	0	0	0.0	0	0
10 - 15	3.4	4	19	-157,972	- 12	319	2,602.5	0	0	0.0	0	. 0
15 - 20	4.5	4	22	-210,630	1	37	3,470.0	0	0	0.0	0	0
20 - 25	5.7	1	4	-263,287	1	33	4,337.5	9	571	0.0	0	. 0
25 - 30	6.8	11	56	-315,945	1	35	5,204.9	0	0	0.0	0	0
30 - 35	7.9	1	4	-368,602	0	8	6,072.4	0	0	0.0	0	0
35 - 40	9.1	8	41	-421,260	27	735	6,939.9	0	0	0.0	0	0
40 - 45	10.2	12	61	-473,917	0	0	7,807.4	83	5,088	0.0	0	0
45 - 50	11.3	14	68	-526,574	0	0	8,674.9	0	0	0.0	0	0
50 - 55	12.5	1	5	-579,232	0	0	9,542.4	0	0	0.0	0	0
55 - 60	13.6	4	19	-631,889	0	0	10,409.9	5	295	0.0	0	0
60 - 65	14.7	11	53	-684,547	0	0	11,277.4	3	204	0.0	. 0	0
65 - 70	15.9	12	60	-737,204	0	0	12,144.9	0	0	0.0	. 0	0
70 - 75	17.0	0	. 0	-789,862	0	0	13,012.4	0	0	0.0	0	. 0
75 - 80	18.2	4	20	-842,519	0	0	13,879.9	0	0	0.0	0	0
80 - 85	19.3	4	20	-895,177	0	0	14,747.4	0	0	0.0	0	0
85 - 90	20.4	2	10	-947,834	0	0	15,614.8	0	0	0.0	0	0
90 - 95	21.6	0	0	-1,000,492	0	0	16,482.3	0	0	0.0	0	0
95 - 100	22.7	0	0	-1,053,149	0	0	17,349.8	0	0	0.0	0	0
Hours Off	0.0	0	8,261	0	0	6,043	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 CEILING FANS

5 5

Day Type

5 3

-----BUILDING TEMPERATURE PROFILES ---------- Zone Number Temperature 2 1 3 2 Range 1 (F) Max. Temp. 82.8 82.8 96.1 94.3 89.7 7 22 7 20 8 22 8 19 8 21 Mo./Hr. Day Type 4 1 ..... Number of Hours ..... Above 100 0 270 95 - 1000 0 90 - 95 0 1,498 1,436 0 0 0 999 931 1,292 85 - 90 0 80 - 85 355 301 173 561 1,044 75 - 80 2,322 1,955 550 542 848 70 - 75 903 1,049 602 634 488 536 367 1,997 2,044 1,685 65 - 70 60 - 65 300 119 1,451 1,517 1,147 55 - 60 1,194 641 552 503 986 50 - 55 637 832 668 592 1,270 Below 50 2,513 3,496 0 0 0 35.1 29.9 54.9 55.0 54.9 Min. Temp. Mo./Hr. 2 8 2 10 1 3 1 20 2 4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 CEILING FANS

----- MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND		
	Off Peak	On Peak	OIL	WATER
Month	(kWh)	(kW)	(Therm)	(1000 Gl)
Jan	5,707	27	747	0
Feb	5,162	27	691	0
March	6,034	27	560	0
April	4,953	27	196	0
May	5,810	29	0	0
June	11,830	97	. 0	0
July	17,057	110	0	0
Aug	12,141	96	0	0
Sept	5,282	81	0	0
Oct	5,427	27	99	0
Nov	5,139	27	368	0
Dec	5,415	27	644	0
Total	89,956	110	3,304	2

Building Energy Consumption = 30,954 (8tu/Sq Ft/Year) Source Energy Consumption = 61,622 (8tu/Sq Ft/Year)

Floor Area = 20,592 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2

CEILING FANS

ŗ	B	11	T	D	М	F	N	T	Ε	N	ŗ	р	G	γ	C	n	N	9	Ш	М	B	T	Ţ	Π	И
L	*	v	4		11	L	11			11	L	U	u			U	- 13	U	v	II.	г	- 1	- 1	U	11

•														
	Equip						thly Con June	sumption			Oct	Nov	Dec	Takal
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	ucı	Nov	vec	Total
0	LIGHTS										=			/
	ELEC PK	4888 25.4	4423 25.4	5354 25.4	4655 25.4	5121 25.4	5121 25.4	4655 25.4	5354 25.4	4655 25.4	5121 25.4	4655 25.4	4655 25.4	58,659 25.4
	PN .	23.4	43.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23,4	23.4
1	MISC LD												1	
•	ELEC	74	67	81	70	-77	77	70	81	70	77	70	70	885
	PK	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD												•	
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	Ō
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1			AIR-	CLD COND	COMP 25	-35 TONS								
	ELEC	0	0	0	0	0	5222	10468	5235	0	0	0	0	20,925
•	PK	0.0	0.0	0.0	0.0	0.0	61.3	73.5	60.4	46.6	0.0	0.0	0.0	73.5
. 1	EQ5200			ENSER FA										
	ELEC	0		0		0	222	519		0	0	0	0	972
	PK	0.0	0.0	0.0	0.0	0.0	3.2	4.0	- 3.2	2.3	0.0	0.0	0.0	4.0
1	EQ5302		CONT	ROLS										
	ELEC	0	0	0	0	0	15	20	13	0	0	0	0	48
•	PK	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0		0	612	1173	1324	1227		0	0	0	4,892
	PK	0.0	0.0	0.0	0.0	2.8	6.6	6.6	6.6	6.6	0.0	0.0	0.0	6.6
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	.0	0	Ō	0		0	. 0	0	0	0	0	. 0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ4003		FC C	ENTRIF.	FAN C.V.									

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 CEILING FANS

														e .
•	ELEC	0	0	0	0	0	Ò	0	0	0	0	0	0	0 .
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2006		OIL	FIRE TUB	E STEAM									
	OIL	747	691	560	196	0	0	0	0	0	99	368	644	3,304
	PK	1.4	1.4	1.4	1.4	0.1	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	215	194	173	66	0	0	0	0	0	66	119	199	1,033
	PK	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
1	EQ5240		BOIL	ER FORCE	D DRAFT	FAN								
	ELEC	93	84	75	28	_ 0	0	0	Ō	0	28	52	86	446
	ÞΚ	0.1	0.1	0.1	0.1	0.1	0.0	0.0 .	0.0	0.0	0.1	0.1	0.1	0.1
1	EQ5307		BOIL	ER CONTR	OLS									
	ELEC	328	296	264	100	0	0	0	0	0	100	182	303	1,574
	PK	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	4	4	4	1	0	0	0	0	0	1	2	4	21
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5406		MAKE	-UP WATE	Ŕ									
	WATER	0	. 0	0	0	0	0	0	0	0	0	0	0	- 2
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5040		FUEL	OIL PUM										
	ELEC	104	94	84	32	0	0	0	0	0	32	58	97	501
	PK	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2

CEILING FANS

-----UTILITY PEAK CHECKSUMS------

Utility EL	ECTRI	C DEMA	ND
------------	-------	--------	----

Peak Value 110.0 (kW) Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Dema	ity Percnt and Of Tot (%)	
Cooling E	Equipment	-		
1	EQ1160S	AIR-CLD COND COMP 25-35 TONS 77	7.5 70.50	
Sub Total	ı	77	7.5 70.50	
Sub Total	1		0.00	
Air Movin	ng Equipment			
1		SUMMATION OF FAN ELECTRICAL DEMAND	6.62	
Sub Total		6	6.6 6.02	
Sub Total	t		0.00	
Miscellan	neous			
Lights Base Uti Misc Equ Sub Total	lities Tipment		3.4 23.13 0.0 0.00 0.4 0.35 5.8 23.48	
Grand Tot	al	110	0.0 100.00	

Building 259

Trace Output File

************************* ************************** ** ANALYSIS ** ** TRACE 600 ** ** ** by ** ************************ *************************

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS. PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 259

CARLISLE Weather File Code:

Location: ENERGY SAVINGS OPPORTUNITY STUDY

40.2 (deq) Latitude: Longitude: 77.2 (deq) .2 Time Zone:

Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 92 (F) Summer Design Dry Bulb: Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20

Winter Ground Relectance: 0.20 0.0742 (Lbm/cuft) Air Density:

0.2444 (Btu/lbm/F) Air Specific Heat: 1.0882 (Btu-min./hr/cuft/F) Density-Specific Heat Prod: Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) 4.4519 (Lb-min./hr/cuft) Enthalpy Factor:

To September Design Simulation Period: May System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

Time/Date Program was Run: 16: 2: 4 1/18/94

Dataset Name: C8259 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

-----SYSTEM SUMMARY -------(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	PTAC	0	1,386	1,386	1,815	429	0	0
2	RAD	0	0	0	0	705	0	0
Intals		0	1.386	1.386	1.815	1.134	0	0

CAPACITY - ALTERNATIVE 1 BASE BUILDING

------ Cooling Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) -87,194 1 PTAC 4.1 0.0 0.0 4.1 -87,194 0 0 0 0 0.0 -126,732 2 RAD 0.0 0.0 0.0 0 0 0 0 -126.7320 0 Totals 4.1 0.0 0.0 4.1 -213,926 0 0 -213,926

The building peaked at hour 16 month 7 with a capacity of 4.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- ENGINEERING CHECKS-------

			Percent		Cool:	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft
1	Main	PTAC	0.00	1.09	340.3	313.5	38.27	1.09	-68.28	1,277
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-62.74	2,020

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

*******	******	***** C	OOLING COIL	. PEAK ****	******	******	***	**** CLG	SPAC	E PEAK ****	***** HEA	TING COIL	PEAK 1	******
Peaked at T Outside Air	==>	0A	DB/WB/HR:	91/ 73/ 98.	0		*	0/	ADB:	91 *		OAD8:		
		Space	Dat Air	Ret. Air	Net	Oaront	*	e,	nara	Percnt *	Snace De	ak Coil	Daak	Percnt
	Sand	Space s.+Lat.							ible		Space Se			
Envelope Loa				(Rtuh)	Total	(%)	*	/Ri		(%) *				
Skylite St	nlr	(80011)	(5001)	(ocan)	0	0.00		(0)	0	0.00 *	, , , ,	0	0	0.00
Skylite Co	ouq .	0	0	, 1	0	0.00			Λ	0 00 *		۸	Λ.	0.00
Roof Cond	one	0	12.456	•	12,456				0	0.00 * 0.00 *		0 -10	).120	12.31
Glass Sola	ar	5.337	12,456	, )	5,337	10.92	*	5.	.622	0.00 * 0.00 * 18.48 * 4.34 *		0	0	0.00
Glass Cond	d	1.369	. 0	· }	1,369	2.80	*	1.	.322	4.34 *	-6.6	93 -	5.693	8.14
			550		10,306			10	.104	33.21 *	-32,8	30 -35	5.544	43.22
Partition		0			0	0.00	*		0	0.00 *				0.00
Exposed F		0				0.00			0	0.00 *		0	0	0.00
Infiltrati					16,462					22.49 *		88 -29		
Sub Total:	::>	32,924	13,006		45,931			23.	890	78.51 *		11 -82		
Internal Loa		,			,				,	*			•	
Lights		1,809	0		1,809	3.70	*	1,	,823	5.99 *		0	0	0.00
People		940			940	1.92	*		475	1.56 *		0	0	0.00
Misc		0	0	, 0	0	0.00	*		0	0.00 *		0	0	0.00
Sub Total:	::>	2,749	U	· U	2,749	5.62	*	2	,298	7.55 *		0	0	0.00
Ceiling Load Outside Air	d	5,555	-5,555		0	0.00	*		,240	13.93 *	-4,3		0	0.00
Outside Air		0	0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sup. Fan Hea	at				197					0.00 *			0	0.00
Ret. Fan Hea			0		0					0.00 *			0	0.00
Duct Heat Pl			0		0					0.00 *		_	0	0.00
OV/UNDR Sizi	_	0			0				0	0.00 *		0	0	0.00
Exhaust Heat			0	•	0					0.00 *			0	0.00
Terminal By	pass		0	0	0	0.00				0.00 *			0	0.00
Grand Total:	==>	41 228	7 451	0	48 876	100.00	*	30	427	* 100 00 *		87 -83	245	100 00
										nn Iwn Iun				
										DB/\B/HR F Grains			.55 (5)	(4)
Main Clg														
Aux Clg	0.0	0.0	0.0	0			0.0	0.0	0.0		ExFlr	0		
-	0.0	0.0	0.0	0			0.0	0.0	0.0			794		0 0
Totals	4.1	48.9	•••	v	V.V \	,,,		0.0	V.,	0 0.0	Wall	1,589	ſ	186 12
		COIL SEL			AIF					-ENGINEERING		TEMPER		
	apacity	Coil A			Туре	Cooling		Heating		lg % OA	0.0	Type	Clg	
	(Mbh)				Vent	0		0		lg Cfm/Sqft	1.09	SAD8		3 116.9
-	-87.2	1,			Infil	429		429		lg Cfm/Ton		Plenum	82.7	
•	0.0	. 1	0 0.0		Supply	1,386		1,386		lg Saft/Ton		Return	82.6	
Preheat	-0.0	1,			Mincfm	1 704		1 706		lg Btuh/Saft	38.27 3	Ret/OA	82.6	
Reheat	0.0		0 0.0		Return Exhaust	1,386		1,386 0		o. People tg % OA	0.0	Runarnd Fn MtrTí		
Humidif Opt Vent	0.0 0.0		0 0.0		Rm Exh	0		0		tg Cfm/SqFt		Fn BldT		
Total	-87.2		v v.v	٧.٧	Auxil	0		. 0		tg 8tuh/SqFt		Fn Frict		
IULAI	01.2				HUNTI	v		v	11	vy oranjout v	00.20	in tito	, v.,	

System 2 Block RAD - RADIATION

	t Time ==:		Mo/Hr:		•		*		Hr:			Mo/Hr: 13		
Outside	Air ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	OF	1D8:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Ne	t Percn	t *	Sp	ace	Percnt *	Space Pea	ık Coil F	eak	Percnt
	Se	ens.+Lat.	Sensible		Tota	l Of To	t *	Sensi	ble	Of Tot *	Space Sen	ns Tot S	ens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh	) (%	) *	(8t	uh)	(%) *	(Btuh	n) (8t	uh)	(\$)
Skylit	e Solr	0	0			0.0	0 *		Ō	0.00 *		0	0	0.00
Skylit	e Cond	0	0			0.0	0 *		0	0.00 *		0	Ō	0.00
Roof C	ond	0	0		(	0.0	0 *		0	0.00 *		0 -8,	992	7.09
Glass	Solar	0	0			0.0	0 *		0	0.00 *		0	0	0.00
Glass	Cond	0	0		(	0.0	0 *		0	0.00 *	-10,23	3 -10,	233	8.07
Wall C	ond	0	0		(	0.0	0 *		0	0.00 *	-54,44	8 -58,	430	46.11
Partit	ion	0			(	0.0	) *		0	0.00 *		0	0	0.00
Expose	d Floor	0			(	0.0	0 *		0	0.00 *		0	0	0.00
Infilt	ration	0			(	0.0	) *		0	0.00 *	-49,07	7 -49,	077	38.73
Sub To	tal==>	0	0		(	0.0	0 *		0	0.00 *	-113,75	8 -126,	732	100.00
Internal	Loads						*			*				
Lights		0	0		(	0.0	0 *		0	0.00 *		0	0	0.00
People		0			(	0.0	) *		0	0.00 *		0	0	0.00
Misc		0	0	0	(	0.0	0 *		0	0.00 *		0	0	0.00
Sub To	tal:=>	0	0	0	(	0.0	) *		0	0.00 *		0	0	0.00
Ceiling	Load	0	0		(	0.0	) *		0	0.00 *	-14,70	17	0	0.00
Outside	Air	0	0	0	(	0.0	) *		0	0.00 *		0	0	0.00
Sup. Fan	Heat					0.0	) *			0.00 *			0	0.00
Ret. Fan	Heat		0		. (	0.0	) *			0.00 *			0	0.00
Duct Hea	t Pkup		0		(	0.0	) *			0.00 *			0	0.00
OV/UNDR	Sizing	0			(	0.00	) *		0	0.00 *		0	0	0.00
Exhaust	Heat		0	0	(	0.0	) *			0.00 *			0	0.00
Terminal	Bypass		0	0	(	0.00				0.00 *			0	0.00
Grand To	tal==>	0	0	0		0.00	* (		0	* 0.00 *		6 -126,	732	100.00
				LING COIL S	E!							AREAS		
		apacity		Coil Airfl		ing DB/W				B/WB/HR	Gross Tota			) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De				-	Grains		2,020	(	, , , ,
ain Clg	0.0	0.0	0.0	0	•	0.0		0.0	-		Part	0		
ux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0			894		0 0
otals		0.0										2,610		84 11
	HEATING	COIL SEL	ECTION		A]	IRFLOWS (	(cfm)			ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacity				Type	Cooling	•	Heating		g % OA	0.0	Type	Clg	
	(Mbh)	(cfi			Vent	(	) .	0		g Cfm/Sqft		SADB	0.0	
ain Htg	-126.7		0 0.0		Infil	(	)	705		g Cfm/Ton		Plenum	0.0	
ux Htg	0.0		0.0	0.0	Supply		)	0		g Sqft/Ton	0.00	Return	0.0	
reheat	0.0		0.0		Mincfm		)	0		g Btuh/Sqft		Ret/OA	0.0	
eheat	0.0		0.0		Return	(	)	0		. People	0	Runarnd	0.0	
umidif	0.0		0 0.0		Exhaust	(	)	0		g % DA	0.0	Fn MtrTD	0.0	0.0
pt Vent	0.0		0.0	0.0	Rm Exh	(	)	0	Ht	g Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
					Auxil									

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

------ 8 U I L D I N G U - V A L U E S -----

						m U-Val /hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr	7 7 - 1.	Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof		Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	156.2	36.57
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.0	38.17
. 3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.4	37.96
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.4	37.96
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	156.2	36.57
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.0	38.17
3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.4	37.96
5	VESTIBULE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	472.6	105.88
6	POWDER ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	472.6	105.88
7	KITCHEN, HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	140.0	33.02
8	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	151.5	35.53
9	MAIN HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	129.8	30.78
10	BATH NO. 2	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	305.1	69.96
11	BATH NO. 1	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	146.0	35.10
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	176.3	41.07
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	166.2	39.11
Buildin	a	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	164.0	38.66

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

- Room	,	Numbe Dupli		Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Area	/Wl	Net Wall Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
. 3	BEDROOM NO. 1	1	1	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
System	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
3	BEDROOM NO. 1	1	1	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	<pre>1 Total/Ave.</pre>				1,277	0	0	0	0	794	186	12	1,404
5	VESTIBULE	1	1	26	26	0	0	0	0	0	6	6	89
6	POWDER ROOM	1	1	26	26	0	0	0	0	0	6	6	89
7	KITCHEN, HALLWAY	1	1	140	140	0	0	0	0	0	24	15	138
8	DINING ROOM	1	1	241	241	0	0	0	0	0	38	13	257
9	MAIN HALLWAY	1	1	210	210	0	0	0	0	0	4	2	191
10	BATH NO. 2	1	1	53	53	0	0	0	0	53	10	8	114
11	BATH NO. 1	1	1	47	47	0	0	0	0	47	11	20	46
Zone	2 Total/Ave.				743	0	Ō	0	0	100	98	10	922
System	2 Total/Ave.				2,020	0	0	0	0	894	284	11	2,326
Buildin					3,297	0	0	0	0	1,688	470	_11	3,729

. ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.417 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.364 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 10.72 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.2	9	137	-10,696	8	387	69.3	0	0	0.0	0	0
5 - 10	0.4	13	194	-21,393	13	597	138.6	0	0	0.0	0	0
10 - 15	0.6	7	96	-32,089	18	835	207.9	0	0	0.0	0	0
15 - 20	0.8	8	112	-42,785	14	664	277.2	42	1,530	0.0	0	0
20 - 25	1.0	13	185	-53,482	17	824	346.5	0	0	0.0	0	0
25 - 30	1.2	13	193	-64,178	22	1,014	415.8	0	0	0.0	0	0
30 - 35	1.4	4	64	-74,874	8	394	485.1	0	0	0.0	0	0
35 - 40	1.6	9	128	-85,571	0	0	554.4	0	0	0.0	0	0
40 - 45	1.8	14	204	-96,267	0	0	623.8	0	0	0.0	0	0
45 - 50	2.0	1	11	-106,963	0	0	693.1	21	765	0.0	0	0
50 - 55	2.2	2	31	-117.659	0	0	762.4	0	0	0.0	0	0
55 - 60	2.4	3	51	-128,356	0	0	831.7	0	0	0.0	0	0
60 - 65	2.6	0	0	-139,052	0	0	901.0	0	0	0.0	0	0
65 - 70	2.9	0	0	-149,748	0	0	970.3	0	0	0.0	0	0
70 - 75	3.1	0	0	-160,445	0	0	1,039.6	0	0	0.0	0	0
75 - 80	3.3	1	20	-171,141	0	0	1,108.9	0	0	0.0	0	0
80 - 85	3.5	1	11	-181,837	0	0	1,178.2	0	0	0.0	0	0
85 - 90	3.7	0	0	-192.534	0	0	1,247.5	0	0	0.0	0	0
90 - 95	3.9	0	0	-203,230	0	0	1,316.8	0	Ō	0.0	0	0
95 - 100	4.1	2	31	-213,926	0	0	1,386.1	38	1,377	0.0	0	. 0
Hours Off	0.0	0	7,292	0	0	4,045	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 BASE BUILDING

***************************************			BUILDING TEMPERATURE PROFILES
Temperature			Zone Number
Range	1 1	. 2	•
· (F)			
Max. Temp.	79.6 92.4	91.5	
Mo./Hr.	7 14 8 21		
Day Type	1 1		
•			Number of Hours
Above 100	0 0	0	
95 - 100	0 0	0	
90 - 95	0 1,200	243	
85 - 90	0 766	1,581	
80 - 85	0 878	1,104	
75 - 80	2,776 792	438	
70 - 75	895 172	629	
65 - 70	425 4,952	4,765	·
60 - 65	320 0		
55 - 60	1,153 0	0	
50 - 55	508 0		•
Below 50	2,683 0	0	
Min. Temp.	35.1 67.9	67.9	
Mo./Hr.	2 11 4 3		
Day Type	5 2		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION-----

ELEC	DEMAND	
Off Peak	On Peak	OIL
(kWh)	(kW)	(Therm)
1,011	2	515
913	2	498
1,021	2	329
951	. 2	136
491	2	0
1,129	8	0
1,971	8	0
1,067	8	0
468	8	0
727	2	58
976	2	243
1,005	2	441
11,732	8	2,220
	Off Peak (kWh) 1,011 913 1,021 951 491 1,129 1,971 1,067 468 727 976 1,005	Off Peak (kWh)  1,011 2 913 2 1,021 2 951 2 491 2 1,129 8 1,971 8 1,067 8 468 8 727 2 976 2 1,005 2

Building Energy Consumption = 79,484 (Btu/Sq Ft/Year)

Source Energy Consumption = 107,321 (Btu/Sq Ft/Year)

Floor Area = 3,297 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	Equip -					Mont	hly Cons	sumption :						
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS											400		
	ELEC	436	394	447	420	442	431	431	447	420	442	420	431	5,162
	PK	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
-1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0 0.0	0 0.0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD	•			•			•		•			•	
	GAS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0.0	0 0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD	•		•	•			•		•	•		•	^
	OIL	0 0.0	0.0	0 0.0	0 0.0	0	0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0.0	0 0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD	۸	^	^	^		•	^	•	^	٨	۸	^	٥
	P STEAM PK	0 0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0.0	0.0	0 0.0
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>v.</b> v	0.0	0.0
5	MISC LD		2		4							•	•	•
	P HOTH20 PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.0
		V.V	0.0	0.0		V. V	0.0	V. V	V.V	0.0	0.0	0.0	V.V	. 0.0
6	MISC LD P CHILL	0	٥	0	0	0	٨	٨	0	٨	٥	0	0	٥
	PK	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0 0.0
		•••					0.0	0.0	V. V	•••	•••	•••	***	•••
1	EQ1161	^		CLD COND			401	115/	405	Δ.	۸	۸	۸	. 0 070
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	491 5.5	1156 5.6	425 5.5	0 5.3	0 0.0	0.0	0 0.0	2,072 5.6
	r n	0.0	0.0	v.v	0.0	0.0	3.3	J.0	3.3	J.J	V.V	0.0	<b>v.</b> v	3.0
1	EQ5200	χ.		ENSER FAI		۸	5.0	115	44	^	Δ.	۸	٨	200
	PK -	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	50 0.5	115 0.5	44 0.5	0 0.2	0 0.0	0.0	0.0	209 0.5
	rn		0.0	V.V	0.0	V.V	V. J	0.5	0.5	V. Z	V. 0	V. V	0.0	0.5
1	EQ5303		CONTI											
	ELEC	0	0	0	0	0	108	220	102	0	0	0	0	430
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003			ENTRIF. 1		_		_						
	ELEC	0	0	0	0	50	48	50	50	48	0	0	0	245
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ2005			FIRE TUBE										
	OIL	515	498	329	136	0	0	0	0	0	58	243	441	2,220
	PK	0.8	0.8	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.7	0.8
	EQ5020													

	ne Air Condit Trane Custon	_		Network										V 600 PAGE 11
	IPMENT ENERGY E BUILDING	Y CONSUMPT	ION - AL	TERNATIV	E 1									
	ELEC	2	2	2	2	0	0	. 0	0	0	1	2	2	14
	PK	0.0	2 0.0	2 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5240		80IL	ER FORCE	D DRAFT	FAN					,			
	ELEC	94	85	94	87	0	0	0	0	0	47	91	94	<b>59</b> 3
•	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
1	EQ5307		BOIL	ER CONTR	OLS									
	ELEC	372	336	372	344	0	0	0	0	0	185	360	372	2,341
	PΚ	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
·1	EQ5040		FUEL	OIL PUM	P C.V.									
	ELEC	106	96	106	98	0	0	0	0	0	53	102	106	666
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

Miscellaneous

Base Utilities

Misc Equipment

Lights

Sub Total

**Grand Total** 

UTILITY F BASE BUIL		S - ALTERNATIVE 1							
			-UTILI	ΙΤΥ	PEAK	CHEC	KSUMS		 
Utility	ELECTRIC DE	MAND							
	e 8.2 me of Peak	(kW) 16 (hr) 7 (mo)						•	
Hour 16	Month 7								
	Equipment Code Name	·	Equipment	Descrip	tion	Utility Demand (kW)	Of Tot		
Cooling E	quipment								
1	EQ1161	AIR-CLD COND COMP	<15 TONS			6.5	78.51		
Sub Total						6.5	78.51		
Sub Total						0.0	0.00		
Air Movin	g Equipment								
1		SUMMATION OF FAN E	LECTRICAL	DEMAND		0.1	1.44		
Sub Total						0.1	1.44		
Sub Total						0.0	0.00		

1.6 20.05

1.6 20.05

8.2 100.00

0.0

0.0

0.00

0.00

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 259

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5

Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20

Winter Ground Relectance:

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

0.20

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 16:14:25 1/18/94

Dataset Name: CB259 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

------ SYSTEM SUMMARY -------(Design Airflow Quantities)

System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Main Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1 PTAC	0	773	773	1,138	366	0	0
2 RAD	0	0	0	0	600	0	0
Totals	0	773	773	1,138	966	0	0

CAPACITY - ALTERNATIVE 2 WALL & ROOF INSULATION

			Coo	ling					Heating			
System Number	System Type	Capacity	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1 F	PTAC	2.3	0.0	0.0	2.3	-40,496	0	0	0	0	0	-40,496
2 F	RAD	0.0	0.0	0.0	0.0	-63,017	0	0	0	0	0	-63,017
Totals		2.3	0.0	0.0	2.3	-103,513	0	0	0	0	0	-103.513

The building peaked at hour 16 month 7 with a capacity of 2.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

System Number		System Type	Percent Outside Air		Cool:	ing		Heat			
	Main/ Auxiliary			Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft	
1	Main	PTAC	0.00	0.60	335.8	555.2	21.62	0.60	-31.71	1,277	
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-31.20	2,020	

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

					******					***** HEAT			******
	at Time ==>		Mo/Hr:				* Mo				Mo/Hr: 13	•	
Outside	Air ==>	UA	DR/MR/HK:	91/ 73/ 98.	0		* U	AD8:	91 *		OADB:	4	
		Space	Qet Δir	Ret. Air	Net	Percnt	* 9	nace	Percnt *		k Coil Po	eak	Percnt
	Sen	ns.+Lat.	Sensible		Total			ible					Of Tot
Envelore	Loads			(8tuh)					(%) *	•			(\$)
		(00011)				0.00			0.00 *		0	0	0.00
			0			0.00		0			0	0	
Roof						8.11			0.00 *		0 -2,	-	
	Solar				5,695		* 5	.677	31.87 *	:	0 -,	0	0.00
	Cond				1,336		* 1	.337	7.50 *	-6,69	3 -6.	693	16.95
	Cond				1,478		* 1	.427	8.01 *	-4,87	4 -5.	319	13.47
		0			0				0.00 *				0.00
	ed Floor				0					ı			0.00
	ration				15,006					-25,46			
	tal==>				25,753				80.70 *		8 -39,		
Internal		•	,				*		*				
Lights	3	1,006	0		1,006	3.64	* 1	,819	10.21 *		0	0	0.00
People	)	734			734	2.66	*	470	2.64 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sub To	tal==>	1,740	0	0	1,740				12.85 *		0	0	0.00
	Load				0					-1,15		0	0.00
	Air	0	0	0	0	-		0			0	0	0.00
Sup. Far					110				0.00 *			0	0.00
Ret. Far			0		0	•			0.00 *			0	0.00
Duct Hea			0		0			^	0.00 *		^	0	0.00
OV/UNDR	-	0		^	0			0	0.00 *		0	0	0.00
Exhaust			0		0				0.00 * 0.00 *			0	0.00
Terminal	. bypass		V	V	V	0.00	*		V.VV *			V	0.00
Grand To	tal==>	26,572	921	0	27.603	100.00	* 17	.813	•	-38,18	0 -39.	478	100.00
				Coil Airfl					o / u o / u o	Gross Tota			
									Grains			3 (31	/ (*)
Main Clo									56.7		•		
Aux Clg	0.0	0.0	0.0	0		0.0 0.		0.0		ExFlr	Ö		
Opt Vent	0.0	0.0	0.0	0		0.0 0.		0.0		Roof	794		0 0
Totals	2.3	27.6									1,589	18	36 12
	WEATING	CULL SEI	ECTION		AI	PELOWS (of	m )		ENGINEERING	CHECKS	TEMPERA	THRES	(F)
	Capacity	Coil A			Type	Cooling	"", Heating		g % OA	0.0	Туре	Clg	Htg
•	(Mbh)				Vent	0	0		g Cfm/Sqft	0.60	SAD8		113.4
Main Htg	-40.5		773 65.2	-	Infil	366	366		g Cfm/Ton	335.85	Plenum	77.0	
Aux Htg	0.0		0 0.0		Supply	773	773		g Sqft/Ton	555.16	Return	77.0	65.8
Preheat	-0.0		773 65.8		Mincfm	0	0		g Btuh/Sqft		Ret/OA	77.0	65.8
Reheat	0.0		0 0.0		Return	773	773		. People	3	Runarnd	75.0	68.0
Humidif	0.0		0 0.0		Exhaust	0	0		g % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0		0 0.0	0.0	Rm Exh	0	. 0		g Cfm/SqFt	0.60	Fn BldTD	0.0	0.0
Total	-40.5				Auxil	0	0	Ht	g Btuh/SqFt	-31.71	Fn Frict	0.1	0.0

System 2 Block RAD - RADIATION

******	********	****** C	OOLING COI	L PEAK ****	******	******	****	**** CLG S	PACE	PEAK ****	***** HEAT	ING COIL PE	AK ***	*****
	; Time ==>		Mo/Hr:				*		r: 0			Mo/Hr: 13/		
				0/ 0/ 0.	. 0		*	OAD		*		OADB: 4		
		Space	Ret. Ai	r Ret. Air	Net	Percnt	*	Spa	CE	Percnt *	Space Pea	k Coil Pe	ak 1	Percnt
	Ser	ns.+Lat.	Sensible		Total			Sensib		Of Tot *	•			Of Tot
Envelope		(Btuh)	(Btuh		(Btuh)	(%)		(Btu		(%) *	•			(\$)
Skylite		0	•	0	0	0.00		(555	0	0.00 *		0	Ó	0.00
Skylite		0		O	0	0.00			0	0.00 *		0	0	0.00
Roof Co		0		0	0	0.00			0	0.00 *		0 -2,1	•	3.45
Glass S		ō		0	0	0.00			0	0.00 *		0	_	0.00
Glass C		0		0	0	0.00			Ŏ	0.00 *		3 -10,2	-	16.24
Wall Co		0	Ì	n	0	0.00			0	0.00 *				13.97
Partiti		0	,	v	0	0.00			0	0.00 *			0	0.00
Exposed		٥			0	0.00			0	0.00 *		Ô	Ô	0.00
Infiltr		٥			0	0.00			0	0.00 *		7 -41,8	•	
Sub Tot		٥		0	0	0.00			0	0.00 *				100.00
Internal		V	,	V	v	0.00	*		V	*	00,12	. 00,0	11 1	100.00
	LUAUS	٨		0	0	0.00			0	0.00 *		0	0	0.00
Lights		0	,	V	0	0.00			0	0.00 *		Λ	Ŏ	0.00
People		0		0 0	0	0.00			0	0.00 *		0	0	
Misc		0			0	0.00			0	0.00 *		٥	0	0.00
Sub Tot		0		•	0				0	0.00 *	-2,98	4	0	0.00
Ceiling L		0		0	•	0.00			0		•	0	0	
Outside A		U	1	0 0	0	0.00			U	0.00 *		V	-	0.00
Sup. Fan				0	0	0.00				0.00 *			0	0.00
Ret. Fan				0	0	0.00				0.00 *			^	0.00
Duct Heat		^	,	0	0	0.00			۸	0.00 *		0	٥	0.00
OV/UNDR S		0			0	0.00			0	0.00 *		U	^	0.00
Exhaust H				0 0	0	0.00				0.00 *			0	0.00
Terminal	Bypass		•	0 0	0	0.00	*			0.00 *			U	0.00
Grand Tot	al==>	0	i	0 0	0	0.00	•		0	0.00 *	-63,10	7 -63,0	17 1	100.00
4,4,14									-					
					ELECTION Enteri							AREAS	(sf)	
	(Tons)				Deg F Deg					Grains		2,020	(31)	(4)
(ain Cla					0.0						Part			
ux Clg	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	Exflr	0		
ox cry Opt Vent	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	Roof	894	,	0 0
Totals	0.0	0.0	0.0	V	V.V (	,,,	v. v	0.0	0.0	0.0		2,610	284	
					AIR					NGINEERING		TEMPERAT		
	Capacity	Coil A			Туре	Cooling		Heating	_	% OA	0.0		Clg	Htg
	(Mbh)	(cf			Vent	0		0		Cfm/Sqft	0.00	SADB	0.0	68.1
Main Htg	-63.0		0 0.0		Infil	0		600	-	Cfm/Ton	0.00	Plenum	0.0	65.0
lux Htg	0.0		0 0.0		Supply	0		0		Sqft/Ton	0.00	Return	0.0	63.1
reheat	0.0		0 0.0		Mincfm	0		0	_	Btuh/Sqft		Ret/OA	0.0	63.1
leheat	0.0		0 0.0		Return	0		0		People	0	Runarnd	0.0	68.0
lumidif	0.0		0 0.0	0.0	Exhaust	0		Ō	_	% DA	0.0	Fn MtrTD	0.0	0.0
	0.0		0 0.0	0.0	Rm Exh	0		0	Hta	Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
Opt Vent	V. V		•	• • • • •	Auxil	•		. •		Btuh/SqFt		Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

Room U-Values												Room
					(Btu	ı/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	158.9	37.10
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.6	38.90
. 3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.7	38.62
System	<ol> <li>Total/Ave.</li> </ol>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.7	38.62
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	158.9	37.10
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.6	38.90
3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.7	38.62
5	VESTIBULE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	480.8	107.53
6	POWDER ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	480.8	107.53
7	KITCHEN, HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	142.4	33.49
8	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	154.0	36.05
9	MAIN HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	132.0	31.22
10	BATH NO. 2	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	311.3	71.20
11	BATH NO. 1	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	149.3	35.77
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	179.4	41.69
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.5	39.75
Buildin	g	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	167.2	39.31

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

-----BUILDING AREAS ------

Room		Dupl	er of	Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
. 3	BEDROOM NO. 1	1	1	219	219	0	Ō	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
System	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
3	BEDROOM NO. 1	1	1	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
5	VESTIBULE	1	1	26	26	0	0	0	0	0	6	6	89
6	POWDER ROOM	1	1	26	26	0	0	0	0	0	6	6	89
7	KITCHEN, HALLWAY	1	1	140	140	0	0	0	0	0	24	15	138
8	DINING ROOM	1	1	241	241	0	0	0	0	0	38	13	257
9	MAIN HALLWAY	1	1	210	210	0	0	0	0	0	4	2	191
10	BATH NO. 2	1	1	53	53	0	0	0	0	53	10	8	114
11	BATH NO. 1	1	1	47	47	0	0	0	0	47	11	20	46
Zone	2 Total/Ave.				743	0	0	0	0	100	98	10	922
System	2 Total/Ave.				2,020	0	0	0	0	894	284	11	2,326
Buildin	· ·				3,297	0	0	0	0	1,688	470	. 11	3,729

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.114 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.093 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 9.35 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.			Capacity	Hours		Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.1	9	82	-5,176	7	306	38.6	0	0	0.0	. 0	0
5 - 10	0.2	9	82	-10,351	11	451	77.3	0	0	0.0	0	0
10 - 15	0.3	7	63	-15,527	19	787	115.9	0	0	0.0	0	0
15 - 20	0.5	1	8	-20,703	18	764	154.5	42	1,530	0.0	0	0
20 - 25	0.6	10	90	-25,878	21	911	193.1	0	0	0.0	0	0
25 - 30	0.7	22	197	-31,054	20	829	231.8	0	0	0.0	0	0
30 - 35	0.8	5	47	-36,230	5	200	270.4	0	0	0.0	0	0
35 - 40	0.9	6	50	-41,405	0	0	309.0	0	0	0.0	0	0
40 - 45	1.0	8	71	-46,581	0	0	347.6	0	0	0.0	0	0
45 - 50	1.2	8	73	-51,756	0	0	386.3	21	765	0.0	0	0
50 - 55	1.3	5	42	-56,932	0	0	424.9	0	0	0.0	0	0
55 - 60	1.4	4	40	-62,108	0	0	463.5	0	0	0.0	0	0
60 - 65	1.5	0	0	-67,283	0	0	502.1	0	0	0.0	0	0
65 - 70	1.6	0	0	-72,459	0	0	540.8	0	0	0.0	0	0
70 - 75	1.7	0	0	-77,635	0	0	579.4	0	0	0.0	0	0
75 - 80	1.8	0	0	-82,810	0	0	618.0	0	0	0.0	0	0
80 - 85	2.0	2	20	-87,986	0	0	656.7	0	0	0.0	0	0
85 - 90	2.1	1	11	-93,162	0	0	695.3	0	0	0.0	0	0
90 - 95	2.2	0	0	-98,337	0	0	733.9	0	0	0.0	0	0
95 - 100	2.3	3	31	-103,513	0	0	772.5	38	1,377	0.0	0	0
Hours Off	0.0	0	7,853	0	0	4,512	0.0	0	5,088	0.0	0	8,760

Day Type

5

## BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

		BUILDING TEMPERATURE PROFILES
Temperature		Zone Number
Range (F)	1 1 2	
Max. Temp.	78.8 94.1 93.3	
Mo./Hr.	7 14 9 20 9 20	
Day Type	1 1 1	
		No. by a Company of the company of t
		Number of Hours
Above 100	0 0 0	
95 - 100	0 0 0	
90 - 95	0 1,773 1,489	
85 - 90	0 463 736	
80 - 85	0 1,100 753	
75 - 80	2,928 272 592	
70 - 75	500 808 846	
65 - 70	700 4,344 4,344	
60 - 65	797 0 0	
55 - 60	771 0 0	
50 - 55	1,165 0 0	·
Below 50	1,899 0 0	
Min. Temp.	39.0 67.9 67.9	
Mo./Hr.	2 11 4 3 4 2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND	
	Off Peak	On Peak	OIL
Month	(kWh)	(kW)	(Therm)
Jan	909	2	228
Feb	821	2	231
March	920	2	150
April	798	2	59
May	469	2	0
June	564	5	0
July	1,226	5	0
Aug	798	5	0
Sept	447	5	0
Oct	442	2	0
Nov	878	2	93
Dec	903	2	187
Total	9,174	5	949

8uilding Energy Consumption = 38,290 (8tu/Sq Ft/Year) Source Energy Consumption = 58,802 (Btu/Sq Ft/Year)

Floor Area = 3,297 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

-----EQUIPMENT ENERGY CONSUMPTION --------

	Equip - Code	Jan	Feb	Mar	Apr	Mont May	hly Cons June	umption · July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS ELEC	436	394	447	420	442	431	431	447	420	442	420	431	5,162
	PK	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
1	MISC LD													
	ELEC PK	0 0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0
			***	010	• • • •	•••	***	•••	•••					
2	MISC LD GAS	٥	٥	۸	0	0	٨	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
_														
3	MISC LD OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
4	P STEAM	0	0	0	0	0	0 .	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
·	P HOTH20	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0
•	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0 0.0	0.0	0 0.0	0.0	0.0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161				COMP <1									
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	71 2.9	551 3.2	225 3.1	0 3.0	0 0.0	0 0.0	0 0.0	847 3.2
	PN .					0.0	2.7	3.2	0.1	5.0	V.V	0.0	<b>V.</b> 0	5.2
1	EQ5200			ENSER FAI		^	-	F./	0.7	٨	^	^	٨	0/
	ELEÇ Pk	0.0	0 0.0	0 0.0	0 0.0	0.0	7 0.1	56 0.3	23 0.3	0 0.1	0 0.0	0.0	0.0	86 0.3
		• • • • • • • • • • • • • • • • • • • •												
1	EQ5303 ELEC	0	CONT O	ROLS 0	0	0	28	161	74	0	0	0	0	263
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
					P. 4. 11									
1	EQ4003 ELEC	0	FC C	ENTRIF. I O	FAN C.V.	28	27	28	28	27	0	0	0	137
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ2005		וזת	FIRE THR	E HOT WA	TFR								
1	OIL	228	231	150	59	0	0	0	0	0	0	93	187	949
	PK	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.4
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								

	onditioning Ec												V 60
By: Trane C	ustomer Direct	Service	Network										PAGE
EQUIPMENT E WALL & ROOF	NERGY CONSUMPT Insulation	ION - AL	TERNATIV	E 2									
ELEC	1	1	1	1	0	0	0	0	0	0	1	1	
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1 EQ5240		BOIL	ER FORCE	D DRAFT	FAN								
ELEC	47	42	47	37	0	0	0	0	0	0	45	47	26
ЬK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.
1 EQ5307		BOIL	ER CONTR	OLS									
ELEC	372	336	372	297	0	0	0	0	0	0	360	372	2,10
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.
1 EQ5040		FUEL	OIL PUM	P C.V.									
ELEC	53	48	53	42	0	0	0	0	Ó	0	51	53	29
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

**Grand Total** 

-----UTILITY PEAK CHECKSUMS-----

5.5 100.00

U T I L I T Y P E A K	CHEC	KSUN
Utility ELECTRIC DEMAND		
Peak Value 5.5 (kW) Yearly Time of Peak 16 (hr) 7 (mo)		
Hour 16 Month 7		
Eqp.  Ref. Equipment  Num. Code Name Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
Cooling Equipment		
1 EQ1161 AIR-CLD COND COMP <15 TONS	3.8	68.77
Sub Total	3.8	68.77
Sub Total	0.0	0.00
Air Moving Equipment		
1 SUMMATION OF FAN ELECTRICAL DEMAND	0.1	1.20
Sub Total	0.1	1.20
Sub Total	0.0	0.00
Miscellaneous		
Lights Base Utilities Misc Equipment Sub Total	1.6 0.0 0.0 1.6	30.02 0.00 0.00 30.02

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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************************** ************************* ** ** TRACE ** 600 ANALYSIS ** ** ************************* *****************************

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 259

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: Longitude:

40.2 (deg) 77.2 (deg)

Time Zone:

5 475 (ft)

Elevation: Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

Summer Design Wet Bulb:

72 (F)

Winter Design Dry Bulb:

4 (F)

Summer Ground Relectance:

0.20

Winter Ground Relectance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (8tu/1bm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4,790.2 (Btu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

1/18/94

Dataset Name:

CB259 .TM

16:27:39

-199,931

0

0

0

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

AIRFLOW - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	PTAC	0	1,402	1,402	1,752	350	0	0
2	RAD	0	0	0	0	574	0	0
Totals		0	1,402	1,402	1,752	924	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

Totals

----- Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (8tuh) 1 PTAC 3.8 0.0 0.0 3.8 -82.287 0 0 0 0 -82.287 2 RAD 0.0 0.0 0 -117,644 0.0 0.0 -117,644 0 0 0

0

The building peaked at hour 16 month 7 with a capacity of 3.8 tons

3.8 -199,931

ENGINEERING CHECKS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

3.8

0.0

0.0

------ ENGINEERING CHECKS------ENGINEERING

			Percent	Cooling				Heating		
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Туре	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	PTAC	0.00	1.10	367.4	334.5	35.87	1.10	-64.44	1,277
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-58.24	2,020

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

	at Time =		Mo/Hr:		*********	******	****		Brace Hr:		********	Aling COII Mo/Hr:		*******
	Air ==>		DB/WB/HR:		. 0		*		DB:	•	k	OADB:		
							*			;	<b>;</b>			
		Space		Ret. Air		Percnt			ace	Percnt >	•		Peak	Percnt
		Sens.+Lat.	Sensible		Total	Of Tot		Sensi		Of Tot			Sens	Of Tot
Envelop		(Btuh)	(Btuh)		(Btuh)	(%)		(Bt	uh)	(%)		uh)	(Btuh)	(\$)
-	te Solr	0	0		0	0.00			0	0.00		0	0	0.00
-	te Cond	0	0		0	0.00			0	0.00 4		0	0	0.00
Roof		0	12,423		12,423	27.12		_	0	0.00 1			0,054	13.12
		5,337	0		5,337	11.65			622	19.26		0	0	0.00
Glass		1,369	0		1,369	2.99			322	4.53 4	,	693 -	*	8.73
Wall (		9,756	<b>5</b> 45		10,301	22.49		10,	_	34.62			5,533	46.37
Parti		0			0	0.00			0	0.00 \$		0	0	0.00
	ed Floor	0			0	0.00			0	0.00 *		0	0	0.00
	tration	13,429	10.0/0		13,429	29.32			575	19.10 *	•		4,353	31.78
Internal	otal==>	29,891	12,968		42,859	93.56		22,6	523	77.51 *	•	s/6 -7	6,633	100.00
Lights		1,809	0		1 000	7 05	*	1 1	227	* 4 25 +		٨		A AA
People		940	U		1,809	3.95 2.05			823 475	6.25 <b>*</b> 1.63 <b>*</b>		0	0	0.00
Misc		0	0	0	740	0.00			475	0.00 *		0	0	0.00
	otal:=>	2,749	0	•	2,749	6.00		2,2		7.87 *		0	0	0.00
Ceiling		5,635	-5,635	٧	2,747	0.00		4,2		14.61 *		•	0	0.00
Outside		0	0,000	0	0	0.00		4,2	0	0.00 *	-	0	0	0.00
Sup. Far		•	v	·	199	0.44			v	0.00 *		V	0	0.00
Ret. Far			0		0	0.00				0.00 *			0	0.00
Duct Hea			0		0	0.00				0.00 *			0	0.00
OV/UNDR	•	0	•		0	0.00			0	0.00 *		0	0	0.00
Exhaust	_		0	0	0	0.00			•	0.00 *		•	0	0.00
Terminal			0	0	0	0.00				0.00 *			0	0.00
٠.					-		*			*			•	****
Grand To	tal==>	38,275	7,333	0	45,807	100.00	*	29,1	85	100.00 *	-68,2	231 -7	6,633	100.00
					ELECTION							11112110		
			Sens Cap.							B/WB/HR	Gross Tot		ass (sf	(%)
	(Tons)	(Mbh)	(Mbh)					Deg F D	_		Floor	1,277		
Main Clg	3.8	45.8	37.8	1,402		.1 66			54.2		Part	0		
Aux Clg	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0	.0	0.0	0.0	0.0	Roof	794		0 0
Totals	3.8	45.8									Wall	1,589	1	86 12
			CTION		AIR					ENGINEERING		TEMPE		
-	•	y Coil Ai				Cooling	. }	leating		% 0A		Type	Clg	
w 2. m	(Mbh)			Deg F	Vent	0		0		Cfm/Sqft	1.10	SADB		112.7
Main Htg	-82.			112.7		350		350		Cfm/Ton	367.40	Plenum	82.8	
Aux Htg	0.	0		0.0	Supply	1,402		1,402		Sqft/Ton	334.53	Return	82.7	
Preheat	-0.			55.7	Mincfm	0		0		Btuh/Sqft		Ret/OA	82.7	
Reheat	0.			0.0	Return	1,402		1,402		People		Runarnd	75.0	
Humidif	0.		0.0	0.0	Exhaust	0		0		% 0A		Fn MtrT		
Opt Vent	0.1		0.0	0.0	Rm Exh	0		0		Cfm/SqFt		Fn BldT		
Total	-82.	ა			Auxil	0		0	Htc	Btuh/SqFt	-64.44	Fn Fric	t 0.1	0.0

System 2 Block RAD - RADIATION

Peaked a				Mo/Hr:						¥	Mo	/Hr:	0/0	*	Mo/H	r: 13/ 1	
Outside (	Air ==>		OADB,	/WB/HR:	0/ 0,	0.	0			*	0	ADB:	0	*		B: 4	
		Spac	e	Ret. Air	Ret.	Air		let.	Percnt	*	S	pace	Percnt	* * Space!	Peak C	oil Peak	Percn
	5	Sens.+Lat		Sensible		ent			Of Tot			ible	Of Tot	•		Tot Sens	Of To
Envelope		(Btuh		(Btuh)			(Btu		(%)			tuh)	(%)	•		(Btuh)	(\$
Skylite			0	(000)		, =,	(000	0	0.00		(5	0	0.00		0	0	0.0
Skylite			0	(				0	0.00			0	0.00		n	0	0.0
Roof Co			ō	Ò				0	0.00			- 0	0.00		0	-8,992	7.6
Glass S			0	(				ō	0.00			Ö	0.00		Ö	0,772	0.0
Glass (			0	(				0	0.00			0		<b>*</b> -10,			
Wall Co			0	Ċ				0	0.00			Ö	0.00			-58,430	
Partiti			0	•	•			0	0.00			0	0.00			0	0.0
	floor		0					0	0.00			0	0.00		0	0	0.0
Infilt			0					0	0.00			0		- -39,		_	
Sub Tot			0	C	)			0	0.00			0	0.00			-117,644	
Internal			V		1			v	0.00	*		v		* -104, *	0/0	117,044	100.0
Lights	Luaus		0	0	١			0	0.00			0	0.00		0	٨	0.0
People			0		'			0	0.00			0			0	0	
Misc			0	C		۸		0	0.00			0	0.00			0	0.0
Sub Tot	1>		٨	-		0		Ţ.					0.00		0	0	0.0
			۸	0		U		0	0.00			0	0.00		0	0	0.0
Ceiling U Outside A			0	0		۸		0	0.00			0	0.00			0	0.0
			U	0		0		0	0.00			0	0.00		0	0	0.0
Sup. Fan				^				0	0.00				0.00			0	0.0
Ret. Fan				0				0	0.00				0.00			0	0.0
Duct Heat			0	U				0	0.00			^	0.00			0	0.0
OV/UNDR S Exhaust H			V	0		۸		0	0.00			0	0.00		0	0	0.0
				0		0		0					0.00			0	0.0
Terminal	oypass			U		U		0	0.00	*			0.00 3			U	0.0
Grand Tot	al==>		0	0		0		0	0.00	-		0	0.00 *		377	-117,644	100.00
*														•			
													B/WB/HR			EAS Glass (s	
		(Mbh)											Grains				1) (9)
ain Clo													0.0				
ux Clg	0.0	0.		0.0		0	0.0	0.0		).0	0.0	0.0		ExFlr	0		
pt Vent	0.0	0.		0.0		0	0.0	0.0		).0	0.0	0.0		Roof	894		0 (
otals	0.0	0.		0.0		v	0.0	٧. ١	, ,	,.v	0.0	۷.۷	v.v	Wall	2,610		284 1
															-,		
		G COIL S							,				ENGINEERING			MPERATURE	
	Capacit	•			Lvg		Type	Cc	ooling		Heating		g % OA	0.0	Ty	-	_
	(Mbh)		cfm)	Deg F	-		Vent		Ō		0		g Cfm/Sqft	0.00	SADB	0.	0 68.1
ain Htg	-117.		0				Infil		0		574		g Cfm/Ton	0.00	Plen		
ux Htg	0.		0		0.		Supply		0		0		g Sqft/Ton	0.00	Retu		
reheat	0.		0			)	Mincfm		0		0	Cl	g Btuh/Sqft	0.00	Ret/	DA 0.	0 47.4
eheat	0.		0	0.0			Return		0		0	No	. People	0	Runa	rnd 0.	0 68.0
umidif	0.		0		0.	)	Exhaust		0		0		g % OA	0.0	Fn M	trID 0.	0.0
lpt Vent	0.	0	0	0.0	0.	)	Rm Exh		0		0	Ht	g Cfm/SqFt	0.00	Fn 8	ldTD 0.	0.0
otal	-117.	6					Auxil		0		. 0		g Btuh/SqFt	-58.24	Fn F		

BUILDING U-VALUES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

						m U-Val					Room	Room
						/hr/sqf					Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	156.2	36.57
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.0	38.17
. 3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.4	37.96
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.4	37.96
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	156.2	36.57
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.0	38.17
3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	165.3	39.33
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	160.4	37.96
5	VESTIBULE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	472.6	105.88
6	POWDER ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	472.6	105.88
7	KITCHEN, HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	140.0	33.02
8	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	151.5	35.53
9	MAIN HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.400	0.568	129.8	30.78
10	BATH NO. 2	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	305.1	69.96
11	BATH NO. 1	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	146.0	35.10
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	176.3	41.07
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	166.2	39.11
Buildin	g	0.000	0.000	0.000	0.000	0.232	0.550	0.563	0.400	0.568	164.0	38.66

BUILDING AREAS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

------ BUILDING AREAS ------

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Sk1 /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
. 3	BEDROOM NO. 1	1	1	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
System	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
3	BEDROOM NO. 1	1	1	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
5	VESTIBULE	1	1	26	26	0	0	0	0	0	6	6	89
6	POWDER ROOM	1	1	26	26	0	0	0	0	0	6	6	89
7	KITCHEN, HALLWAY	1	1	140	140	0	0	0	0	0	24	15	138
8	DINING ROOM	1	1	241	241	0	0	0	0	.0	38	13	257
9	MAIN HALLWAY	1	1	210	210	0	0	0	0	0	4	2	191
10	BATH NO. 2	1	1	53	53	0	0	0	0	53	10	8	114
11	BATH NO. 1	1	1	47	47	0	0	0	0	47	11	20	46
Zone	2 Total/Ave.				743	0	0	0	0	100	98	10	922
System	2 Total/Ave.				2,020	0	0	0	0	894	284	11	2,326
Buildin					3,297	0	0	0	0	1,688	470	_ 11	3,729

. ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.417 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.364 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 10.72 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

## System Totals

Percent	Cool	ling Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity		Hours	Cap.		Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.2	3	42	-9,997	8	365	70.1	0	0	0.0	0	0
5 - 10	0.4	18	266	-19,993	13	591	140.2	0	0	0.0	0	0
10 - 15	0.6	7	108	-29,990	17	792	210.4	0	0	0.0	0	0
15 - 20	0.8	6	93	-39,986	15	706	280.5	42	1,530	0.0	0	0
20 - 25	1.0	14	215	-49,983	18	851	350.6	0	0	0.0	0	0
25 - 30	1.1	10	154	<b>-59,97</b> 9	24	1,095	420.7	0	0	0.0	0	0
30 - 35	1.3	8	122	-69,976	5	244	490.9	0	0	0.0	0	0
35 - 40	1.5	7	108	-79,972	0	0	561.0	0	0	0.0	0	0
40 - 45	1.7	14	204	-89,969	0	0	631.1	O	0	0.0	0	0
45 - 50	1.9	3	50	-99,965	0	0	701.2	21	765	0.0	0	0
50 - 55	2.1	2	31	-109,962	0	0	771.3	0	0	0.0	0	0
55 - 60	2.3	2	31	-119,958	0	0	841.5	0	0	0.0	0	0
60 - 65	2.5	1	20	-129,955	0	0	911.6	0	0	0.0	0	0
65 - 70	2.7	0	0	-139,951	0	0	981.7	0	0	0.0	0	0
70 ~ 75	2.9	0	0	-149,948	0	0	1,051.8	0	0	0.0	0	0
75 - 80	3.1	0	0	-159.944	0	0	1,122.0	0	0	0.0	0	0
80 - 85	3.2	1	20	-169,941	0	0	1,192.1	0	0	0.0	0	ō
85 - 90	3.4	1	11	-179,938	0	0	1,262.2	. 0	0	0.0	0	0
90 - 95	3.6	0	0	-189,934	0	ō	1,332.3	0	0	0.0	0	. 0
95 - 100	3.8	2	31	-199,931	0	0	1,402.4	38	1,377	0.0	0	ō
Hours Off	0.0	0	7,254	0	0	4,116	0.0	0	5,088	0.0	0	8,760

## BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

			BUILDING TEMPERATURE PROFILES
Temperature			Zone Number
	1 1	0	ZOTIC MURDET
Range (F)	1 1	2	
Max. Temp.	79.6 92.4	91.5	
Mo./Hr.	7 14 8 21		
Day Type	1 1		
, .,,			·
٠			Number of Hours
Above 100	0 0	0	
95 - 100	0 0	0	
90 - 95	0 1,200	243	
85 - 90		1,581	
80 - 85		1,104	
75 - 80	2,878 792		
70 - 75	845 206		
65 - 70	385 4,918		· ·
60 - 65	308 0		
55 - 60	1,196 0		
50 - 55	533 0		·
Below 50	2,615 0		
	•		
Min. Temp.	35.6 67.9	67.9	
Mo./Hr.	2 11 1 20		
Day Type	5 1	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND	
	Off Peak	On Peak	OIL
Month	(kWh)	(kW)	(Therm)
Jan	996	2	479
Feb	900	2	460
March	1,007	2	302
April	926	. 2	117
May	492	2	0
June	1,155	8	0
July	1,947	8	0
Aug	1,089	8	0
Sept	469	7	0
0ct	691	2	47
Nov	962	2	226
Dec	991	2	412
Total	11,625	8	2,044

Building Energy Consumption =

74,018 (Btu/Sq Ft/Year)

Source Energy Consumption = 101,351 (Btu/Sq Ft/Year)

Floor Area = 3,297 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------EQUIPMENT ENERGY CONSUMPTION------

	Equip -						-	sumption						
um	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota
0	LIGHTS													
	ELEC	436	394	447	420	442	431	431	447	420	442	420	431	5,16
	PK	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2	MISC LD													
	GAS	0	0	0	0	0	0 0.0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
3	MISC LD			•	•	•			•					
	OIL PK	0 0.0	0 0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.
,														
4	MISC LD P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.
5	MISC LD									,				
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	_ 0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ1161				COMP <15								_	
	ELEC	0	0	0	0	0	506	1131	436	0	0	0	0	2,0
	PK	0.0	0.0	0.0	0.0	0.0	5.1	5.3	5.1	4.9	0.0	0.0	0.0	5.
1	EQ5200			NSER FAI			50		15	•	•			
	ELEC PK	0 0.0	0 0.0	0.0	0.0	0.0	52 0.5	112 0.5	45 0.5	0 0.2	0 0.0	0 0.0	0.0	20
I	EQ5303 ELEC	^	CONTR	(ULS <b>0</b>	0	0	117	223	112	^	۸	^	Λ.	4
	PK	0 0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0 0.3	0.0	0 0.0	0.0	4:
			F0 0/											
1	EQ4003 ELEC	۸	0	NTRIF. 9	AN C.V.	50	49	50	EΛ	40	^	^	۸	^
	PK	0 0.0	0.0	0.0	0.0	0.1	0.1	0.1	50 0.1	49 0.1	0 0.0	0.0	0 0.0	2
1	EQ2005		וזה	TRE TILD	HOT WAT	TER								
•	OIL	479	460	302	117	0	0	0	0	0	47	226	412	2,0
	PK	0.7	0.8	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.6	0

	ne Air Condi Trane Custo	_		Network		•								V 600 Page
	IPMENT ENERG		ION - AL	TERNATIV	E 3									
	ELEC	2	2	2	2	0	0	0	0	0	1	2	2	13
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5240		80IL	ER FORCE	D DRAFT	FAN								
	ELEC	88	79	88	79	0	0	0	0	0	39	85	88	544
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
1	EQ5307		BOIL	ER CONTRI	OLS									
	ELEC	372	336	372	336	0	0	0	0	0	166	360	372	2,31
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.9
1	EQ5040		FUEL	OIL PUM	P C.V.									
	ELEC	98	89	98	89	0	0	0	0	0	44	95	98	61
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

## UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

U 7 I	[ L	II	Υ	Ρ	E A	A K	C	Н	Ε	C	K	S	UM	1 S	; -
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	, , , , , , , , , , , , , , , , , , , ,	- 0 7 1 L 1	ITY PEAK	CHEC	KSUM
Utility ELECTRI	IC DEMAND				
Peak Value Yearly Time of Pe	7.8 (kW) eak 16 (hr) 7 (mo)				
Hour 16 Month 7	7			•	
Eqp. Ref. Equipm Num. Code N		Equipment	Description	Utility Demand (kW)	Percnt Of Tot (%)
Cooling Equipment	;				
1 EQ11	61 AIR-CLD COND COMP	<15 TONS		6.1	77.43
Sub Total				6.1	77.43
Sub Total				0.0	0.00
Air Moving Equipm	nent				
1	SUMMATION OF FAN E	ELECTRICAL	DEMAND	0.1	1.53
Sub Total				0.1	1.53
Sub Total				0.0	0.00

Miscellaneous		
Lights Base Utilities Misc Equipment Sub Total	1.6 0.0 0.0 1.6	21.04 0.00 0.00 21.04
Grand Total	7.8	100.00

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 259

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5

Elevation: 475 (ft)

Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 16:39:48 1/18/94

Dataset Name: C8259 .TM

AIRFLOW - ALTERNATIVE 4 COMBINED ECOS

----- SYSTEM SUMMARY------(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	PTAC	0	664	664	950	286	0	0
2	RAD	0	0	0	0	470	0	0

0 664

CAPACITY - ALTERNATIVE 4 COMBINED ECOS

Totals

756

950

(Design Capacity Quantities)

			Coo:	ling					Heating			
System Number		Main Sys. Capacity (Tons)	_	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (8tuh)	Heating Totals (8tuh)
1	PTAC	2.0	0.0	0.0	2.0	-34,973	0	0	0	0	0	-34,973
2	RAD	0.0	0.0	0.0	0.0	-53,929	0	0	0	0	0	-53,929
Totals		2.0	0.0	0.0	2.0	-38,901	0	0	0	0	0	-88,901

The building peaked at hour 16 month 7 with a capacity of 2.0 tons

ENGINEERING CHECKS - ALTERNATIVE 4 COMBINED ECOS

----- ENGINEERING CHECKS--------------------

System Number			Percent					Heat			
	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
1	Main	PTAC	0.00	0.52	326.4	627.8	19.11	0.52	-27.39	1,277	
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-26.70	2,020	

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

										***** HEAT		
Peaked a	t Time ==	;	Mo/Hr: ADB/WB/HR:	7/16	۸				.,		Mo/Hr: 13/	l
UUTSIGE	#1r ==>	UF	HUB/WB/HR:	91/ /3/ 98.	U		* U	HUB:	<b>*</b>		OADB: 4	
		Space	Ret Air	Ret. Air	Net	Percnt	* S	nace	Percnt *		Coil Pea	k Percnt
	9	Sens.+Lat.	Sensible			Of Tot		ible	Of Tot *			
Envelope		(Btuh)		(Btuh)	(Btuh)	(%)		tuh)	(%) *		) (Btuh	) (%)
		0		(50211)	0			0	0.00 *	(002	)	0.00
Skylit			0		0			0	0.00 *		)	0.00
Roof C		0	2,338			9.58		0	0.00 *	1	-2,00	
		5.337	0		5,337			,677	34 25 *			0 0 0
Glass	Cond	1.369	. 0	ı	1,369			,337	8.06 *	-6,69	3 -6.69	3 19.72
Wall C		1,415			1,534			,427	8.61 *			
Partit		0			0	0.00	*	0	0.00 *			
	d Floor	0			0		*	0	0.00 *	(		0.00
Infilt		10,987			10,987			,644			-19,92	
			2,457		21,566				78.93 *		-33,93	
Internal		- ,	-,,		-,			,	*		,	
Lights		1,809	0		1,809	7.41	* 1	,819	10.97 *	(	) (	0.00
People		940			940	3.85		470	2.83 *		)	0.00
Misc		0		0	0	0.00	*	0	0.00 *		) (	0.00
	tal==>	2,749	0	0	2,749	11.26	* 2	,288	13.81 *		)	0.00
Ceiling	Load	1,547	-1,547		0	0.00		,204	7.26 *		1	0.00
Outside :		0	0		0	0.00	*	0	0.00 *		)	0.00
Sup. Fan					94	0.39	*		0.00 *		(	0.00
Ret. Fan			0		0	0.00	*		0.00 *		(	0.00
Duct Hea	t Pkup		0		0	0.00	*		0.00 *			0.00
OV/UNDR	Sizing	0			0	0.00	<b>‡</b>	0	0.00 *	(	) (	0.00
Exhaust			0	0	0	0.00	*		0.00 *		. (	0.00
Terminal	<b>Bypass</b>		0	0	0	0.00	*		0.00 *			0.00
							*		*		-	
Grand To	tal==>	23,405	910	. 0	24,409	100.00	* 16	,577	100.00 *	-32,73	-33,93	6 100.00
										Gross Total		(sf) (%)
									F Grains	Floor		
									3 53.0	Part		
Aux Clg	0.0	0.0	0.0	0		0.0		0.0		ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	794	0 0
Totals	2.0	24.4								Wall	1,589	186 12
			ECTION		AIR				-ENGINEERING		TEMPERATU	• •
	Capacit			_		Cooling	Heating		lg % OA	0.0		lg Htg
	(Mbh)				Vent	0	0		lg Cfm/Sqft	0.52		2.1 113.3
Main Htg	-35.		664 64.9		Infil	286	286		lg Cfm/Ton	326.40		7.1 65.6
Aux Htg	0.				Supply	664	664		lg Sqft/Ton	627.81		7.2 65.6
Preheat	-0.		664 65.6		Mincfm	0	0		lg Btuh/Sqft			7.2 65.6
Reheat	0.		0 0.0		Return	664	664		o. People	3		5.0 68.0
Humidif	0.		0 0.0		Exhaust	0	0		tg % OA	0.0		0.0 0.0
Opt Vent	0.		0 0.0	0.0	Rm Exh	0	. 0		tg Cfm/SqFt			0.0 0.0
Total	-35.	0			Auxil	0	0	Hi	tg Btuh/SqFt	-27.39	Fn Frict	0.1 0.0

System 2 Block RAD - RADIATION

										BEAR				
			OOLING COIL Mo/Hr:		******	******	*****		SPACE Hr: 0		******* HEA			******
Peaked at Outside A			DB/WB/HR:	•	٨		*	0AI		0 3	r Ł	Mo/Hr: 13 OADB:		
outside F	111/	UH	. און נטאין מע	0/ 0/ 0.	V		*	Uni	νυ.	v .	, k	UNDO.	•	
		Space	Ret Air	Ret. Air	Net	Perch	t *	Sna	ace	Percnt 4	Space Pe	ak Coil F	Peak	Percnt
		Sens.+Lat.	Sensible		Total			Sensi		Of Tot	•			Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)		) *	(Bt		(%)			uh)	(\$)
Skylite		(0.011)	(6001)		(0,011)		) *	(00	0	0.00		0	0	0.00
Skylite		-	٨		0		0 *		0	0.00		٨	Ö	0.00
•		0	0		0		) *		0	0.00 4		0 -2	.174	4.03
Roof Co		^	V		0		0 *		0	0.00 4		Λ 2,	0	0.00
Glass S		0			0		) *		0	0.00 4		33 <b>-</b> 10,	-	18.97
Glass (		۷	0		0		) *		0	0.00		84 -8,		16.32
Wall Co		0	V		0				-			_	_	0.00
Partiti		V			0		) *		0	0.00 *		0	0	0.00
Exposed		0			0		) *		0	0.00		0	710	
Infiltr		0			0		) *		0	0.00			718	60.67
Sub Tot		0	0		0	0.00	) *		0	0.00		35 -53,	929	100.00
Internal	Loads					0.0	*		•					
Lights		0	0		0		) *		0	0.00 *		0	0	0.00
People		0			0		*		0	0.00		V	0	0.00
Misc		0	0	•	0		*		0	0.00 1		0	0	0.00
Sub Tot		0	0	-	0	0.00			0	0.00 *		0	0	0.00
Ceiling L		0	0		0		) *		0	0.00			0	0.00
Outside A		0	0	0	0		) *		0	0.00 *		0	0	0.00
Sup. Fan			_		0		) *			0.00			0	0.00
Ret. Fan			0		0		*			0.00 \$			0	0.00
Duct Heat			0		0		) *			0.00			0	0.00
OV/UNDR S		0			0		) *		0	0.00		0	0	0.00
Exhaust H			0	-	0		) *			0.00			. 0	0.00
Terminal	Bypass		0	0	0	0.00	) *			0.00	<b>t</b>		0	0.00
							*			*	<b>K</b>			
Grand Tot	:al==>	0	0	0	0	0.00	) *		0	0.00 *	-54,0	19 -53,	929	100.00
				LING COIL S								AREAS		
			Sens Cap.			ng DB/WE				/WB/HR			s (sf	(\$)
	(Tons)	(Mbh)	(Mbh)	(cfm)	-	-		-			Floor	2,020		
Main Clg	0.0			0			0.0			0.0	Part	0	•	
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	Exflr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	894		0 0
Totals	0.0	0.0									Wall	2,610	2	84 11
	HEATIN	G COIL SEL	ECTION		AI	RFLOWS (	(cfm)		E	NGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacit	y Coil A	irfl Ent	Lvg	Type	Cooling	9	Heating	Clg	% OA	0.0	Type	Clg	Htg
	(Mbh)	cfi (cf	m) Deg F	Deg F	Vent	(	)	0	Clg	Cfm/Sqft	0.00	SADB	0.0	68.1
Main Htg	-53.		0 0.0		Infil	(	)	470	Clg	Cfm/Ton	0.00	Plenum	0.0	65.0
Aux Htg	0.	0	0 0.0	0.0	Supply	(	)	0	Clg	Sqft/Ton	0.00	Return	0.0	63.1
Preheat	0.		0 0.0	0.0	Mincfm	(	)	0	-	Btuh/Sqft	0.00	Ret/OA	0.0	63.1
Reheat	0.		0 0.0	0.0	Return	(	)	. 0	No.	People	0	Runarnd	0.0	68.0
Humidif	0.		0.0		Exhaust		)	0		% DA	0.0	Fn MtrTD	0.0	
Opt Vent	0.		0 0.0		Rm Exh	(	)	0	-	Cfm/SqFt	0.00	Fn BldTD	0.0	
Total	-53.				Auxil	(	0	. 0	_	Btuh/SqFt		Fn Frict	0.0	

BUILDING U-VALUES - ALTERNATIVE 4 COMBINED ECOS

------ BUILDING U-VALUES------

					Room	Room						
					(Btu	ı/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	158.9	37.10
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.6	38.90
. 3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.7	38.62
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.7	38.62
1	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	158.9	37.10
2	MASTER BEDROOM	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.6	38.90
3	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
4	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.0	40.07
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	163.7	38.62
5	VESTIBULE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	480.8	107.53
6	POWDER ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	480.8	107.53
7	KITCHEN, HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	142.4	33.49
8	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	154.0	36.05
9	MAIN HALLWAY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.059	0.568	132.0	31.22
10	BATH NO. 2	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	311.3	71.20
11	BATH NO. 1	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	149.3	35.77
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	179.4	41.69
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	169.5	39.75
Buildin	g	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.059	0.568	167.2	39.31

BUILDING AREAS - ALTERNATIVE 4
COMBINED ECOS

------BUILDING AREAS -----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	LIVING ROOM	1	1	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	1	356	356	0	0	0	0	356	54	12	383
. 3	BEDROOM NO. 1	1	1	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	1	1	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.	•	•		1,277	0	0	0	0	794	186	12	1,404
System	1 Total/Ave.				1,277	0	0	0	0	794	186	12	1,404
1	LIVING ROOM	1	t	483	483	0	0	0	0	0	70	12	532
2	MASTER BEDROOM	1	î	356	356	0	0	0	ō	356	54	12	383
3	BEDROOM NO. 1	1	ī	219	219	0	0	0	0	219	31	11	244
4	BEDROOM NO. 2	í	i	219	219	0	0	0	0	219	31	11	244
Zone	1 Total/Ave.	•	•	217	1,277	0	0	0	0	794	186	12	1,404
5	VESTIBULE	1	1	26	26	0	0	Ô	Ô	0	6	6	89
6	POWDER ROOM	1	1	26	26	0	0	0	0	0	6	6	89
7	KITCHEN, HALLWAY	1	1	140	140	0	0	0	0	0	24	15	138
8	DINING ROOM	1	1	241	241	0	0	0	0	0	38	13	257
9	MAIN HALLWAY	1	1	210	210	0	0	. 0	0	0	4	2	191
10	BATH NO. 2	1	1	53	53	0	0	0	٥	53	10	8	114
11	BATH NO. 1	í	1	47	47	0	0	0	٥	47	11	20	46
Zone	2 Total/Ave.	1	1	41	743	0	0	0	٥	100	98	10	922
System	2 Total/Ave.				2,020	٥	0	0	٥	894	284	11	2,326
Buildin					3,297	0	0	0	0	1,688	470	11	3,729

. ASHRAE 90 ANALYSIS - ALTERNATIVE 4 COMBINED ECOS

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.114 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.093 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 9.35 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 COMBINED ECOS

## System Totals

Percent	Cooling Load		Heating Load			Cooling Airflow			Heating Airflow			
Design Load	Cap. (Ton)		Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	13	148	-4,445	10	396	33.2	0	0	0.0	0	0
5 - 10	0.2	6	68	-8,890	11	450	66.4	0	0	0.0	0	0
10 - 15	0.3	8	85	-13,335	14	576	99.6	0	0	0.0	0	0
15 - 20	0.4	7	75	-17,780	19	769	132.8	42	1,530	0.0	0	0
20 - 25	0.5	7	81	-22,225	22	872	166.0	0	0	0.0	0	0
25 - 30	0.6	17	186	-26,670	20	791	199.2	0	0	0.0	0	0
30 - 35	0.7	5	54	-31,116	3	132	232.4	0	0	0.0	0	0
35 - 40	0.8	6	62	-35,561	0	0	265.6	0	0	0.0	0	0
40 - 45	0.9	4	40	-40,006	0	0	298.8	0	0	0.0	0	0
45 - 50	1.0	7	82	-44,451	0	0	332.0	21	765	0.0	0	0
50 - 55	1.1	10	108	-48,896	0	0	365.2	0	0	0.0	0	0
55 - 60	1.2	1	11	-53,341	0	0	398.4	0	0	0.0	0	0
60 - 65	1.3	4	40	-57,786	0	0	431.5	0	0	0.0	0	. 0
65 - 70	1.4	0	0	-62,231	0	0	464.7	0	0	0.0	0	0
70 - 75	1.5	0	0	-66,676	0	0	497.9	0	0	0.0	0	0
75 - 80	1.6	0	0	-71,121	0	0	531.1	0	0	0.0	0	0
80 - 85	1.7	0	0	-75,566	0	0	564.3	0	0	0.0	0	0
85 - 90	1.8	0	0	-80,011	0	0	597.5	0	0	0.0	0	. 0
90 - 95	1.9	0	0	-84,456	0	0	630.7	0	0	0.0	0	0
95 - 100	2.0	6	62	-88,901	0	0	663.9	38	1,377	0.0	0	_ 0
Hours Off	0.0	0	7,658	0	0	4,774	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

				BUILDING TEMPERATURE PROFILES
Temperature Range	i	i	 2	Zone Number
(F)				
Max. Temp.	78.8	94.1	93.3	
Mo./Hr.	7 14	9 20	9 20	
Day Type	1	1	1	
Above 100	0	0	0	
95 - 100	0	0	0	
90 - 95	0	1,773	1,489	
85 - 90		497		
80 - 85	0	1,094	703	
75 - 80	2,928			
70 - 75	590			
65 - 70	656	4,344	4,232	·
60 - 65	1,019			
55 - 60	673		0	
50 - 55	1,226	0	0	·
Below 50	1,668	0	0	
Min. Temp.	41.0	67.9	67.9	
Mo./Hr.		3 20		
Day Type	5	1	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

------ MONTHLY ENERGY CONSUMPTION -----

ELEC	DEMAND	
Off Peak	On Peak	OIL
(kWh)	(kW)	(Therm)
894	2	192
808	2	193
905	2	123
707	. 2	40
465	2	0
585	5	0
1,251	5	0
845	5	0
443	5	0
442	2	0
765	2	48
889	2	159
9,000	5	755
	Off Peak (kWh) 894 808 905 707 465 585 1,251 845 443 442 765 889	Off Peak (kWh) (kW)  894 2 808 2 905 2 707 2 465 2 585 5 1,251 5 845 5 443 5 442 2 765 2 889 2

Building Energy Consumption = 32,209 (Btu/Sq Ft/Year)

Source Energy Consumption = 52,050 (Btu/Sq Ft/Year)

Floor Area = 3,297 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION

	Equip	7	rah	M	۸			umption ·		0	0-4	No.	Nac	Yaka
UM	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota
0	LIGHTS													
	ELEC	436	394	447	420	442	431	431	447	420	442	420	431	5,16
	PK	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0 .	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4	MISC LD													
	P STEAM	0	0	0	0	0	0.0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0.0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	_ 0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0 0.0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	EQ1161			CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	0	86	550	255	0	0	0	0	81
	PK	0.0	0.0	0.0	0.0	0.0	2.6	2.8	2.7	2.6	0.0	0.0	0.0	2
1	EQ5200		COND	ENSER FAI	NS									
	ELEC	Ō	0	0	0	0	9	55	26	0	0	0	0	•
	PK	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0
l	EQ5303	•	CONT	ROLS										
	ELEC	0	0	0	0	0	36	191	93	0	0	0	0	3
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	. 0
	EQ4003		FC CI	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	24	23	24	24	23	0	0	0	1
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0
ĺ	EQ2005		OIL	FIRE TUB	E HOT WA	TER								
	OIL	192	193	123	40	0	0	0	0	0	0	48	159	7
	PK	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0

V 600 Trane Air Conditioning Economics By: Trane Customer Direct Service Network PAGE 47 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS 1 5 ELEC 1 1 1 0 0 0 0 0 1 1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 PK 0.0 BOILER FORCED DRAFT FAN 1 EQ5240 212 0 0 0 0 30 40 ELEC 40 36 40 25 0 0 0.0 0.0 0.1 0.1 PK 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.1 1 EQ5307 BOILER CONTROLS 0 0 0 0 280 372 1,965 0 0 ELEC 372 336 372 233 0.5 0.0 0.0 0.0 0.5 0.5 PK 0.5 0.5 0.5 0.5 0.0 0.0 0.0 1 EQ5040 FUEL OIL PUMP C.V. 34 45 238 0 0 0 0 0 ELEC 45 41 45 28 0 0.0 0.0 0.0 0.1 0.1 0.1 0.0 0.0 PK 0.1 0.1 0.1 0.1 0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 COMBINED ECOS

Grand Total

 UTILITY PEAK	K CHECKSUMS	

5.1 100.00

UTILITY PEAK	CHEC	KSUM
Utility ELECTRIC DEMAND		
Peak Value 5.1 (kW) Yearly Time of Peak 16 (hr) 7 (mo)		
Hour 16 Month 7		
Eqp. Ref. Equipment Num. Code Name Equipment Description	Utility Demand (kW)	
Cooling Equipment		
1 EQ1161 AIR-CLD COND COMP <15 TONS	3.4	66.42
Sub Total	3.4	66.42
Sub Total	0.0	0.00
Air Moving Equipment		
1 SUMMATION OF FAN ELECTRICAL DEMAND	0.1	1.12
Sub Total	0.1	1.12
Sub Total	0.0	0.00
Miscellaneous		
Lights Base Utilities Misc Equipment Sub Total	1.6 0.0 0.0 1.6	32.46 0.00 0.00 32.46

Building 311 (Typical for 312)

Trace Input File

```
CONTENTS OF : E:\CB311.TM
LINE #
   1
       JOB - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 311
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
       19/1/BASE BUILDING
  12
       20/1/1/HALL/117/1/1/.8/.45/10.8//2
  13
       20/2/1/LIVING ROOM/188/1/1/.8/.45/10.8//2
  14
       20/3/1/FAMILY ROOM/255/1/1/.8/.45/10.8//2
  15
       20/4/1/BEDROOM NO. 1/175/1/1/0//10.8//2
  16
       20/5/1/BEDROOM NO. 2/189/1/1/0//10.8//2
  17
       20/6/1/SEWING ROOM/218/1/1/0//10.8//2
  18
  19
       20/7/2/BATH/49/1/1/.8/.45/10.8//2
  20
       20/8/2/KITCHEN/218/1/1/.8/.45/10.8//2
       20/9/2/DINING ROOM/184/1/1/.8/.45/10.8//2
  21
  22
       20/10/2/BATH/49/1/1/0//10.8//2
       20/11/2/BEDROOM NO. 3/184/1/1/0//10.8//2
  23
       20/12/2/HALL/141/1/1/0//10.8//2
  24
  25
       20/13/2/BATH/39/1/1/0//10.8//2
       21/M///CBLQTX///CBLQTX
  26
  27
       22/4/1/YES////176
  28
       22/5/1/YES////176
  29
       22/6/1/YES////176
       22/10/1/YES////176
  30
  31
       22/11/1/YES////176
  32
       22/12/1/YES////176
       22/13/1/YES////176
  33
       24/1/1/6/9.8//178/109
  34
  35
       24/2/1/15/9.8//178/19
       24/2/2/13/9.8//178/109
  36
       24/3/1/11/9.8//178/19
  37
       24/4/1/15/9.8//178/19
  38
  39
       24/4/2/13/9.8//178/109
       24/5/1/11/9.8//178/19
  40
       24/6/1/7/9.8//178/289
  41
  42
       24/7/1/7/9.8//178/289
  43
       24/7/2/7/9.8//178/19
  44
       24/8/1/7/9.8//178/289
       24/9/1/12/9.8//178/289
  45
  46
       24/9/2/15/9.8//178/19
       24/9/3/7/9.8//178/109
  47
       24/10/1/7/9.8//178/289
  48
       24/10/2/7/9.8//178/19
  49
       24/11/1/12/9.8//178/289
 50
 51
       24/11/2/15/9.8//178/19
 52
       24/11/3/7/9.8//178/109
       24/13/1/6/9.8//178/109
 53
       25/1/1/3.6/1/1/1.04/1
  54
       25/2/1/4/1.5/2/.55/.57
  55
       25/2/2/4/1.5/2/.55/.57
  56
       25/3/1/4.5/2.25/2/.55/.57
  57
       25/4/1/4/1.5/2/.55/.57
 58
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CONTENTS OF : E:\CB311.TM
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  59
       25/5/1/4.5/2.25/2/.55/.57
  60
       25/6/1/4/1.5/1/.55/.57
  61
       25/7/1/3/1.25/1/.55/.57
  62
       25/8/1/3/1.25/1/.55/.57
 63
       25/9/1/4/1.5/2/.55/.57
 64
       25/9/2/4/1.5/2/.55/.57
       25/9/3/3.6/1/1/1.04/1
 65
 66
       25/10/1/4/1.5/1/.55/.57
 67
       25/11/1/4/1.5/2/.55/.57
 68
       25/11/2/4/1.5/2/.55/.57
 69
       25/11/3/4/1.5/1/.55/.57
 70
       25/13/1/4/1.5/1/.55/.57
 71
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF/OFF
 72
       27/M/502/SF-PERS/230/190/.5/WATT-SF/INCAND
 73
       29/1////.31/CFM-SF/.31/CFM-SF
 74
      29/2////.31/CFM-SF/.31/CFM-SF
 75
      29/3////.31/CFM-SF/.31/CFM-SF
 76
      29/4////.31/CFM-SF/.31/CFM-SF
 77
      29/5////.31/CFM-SF/.31/CFM-SF
 78
      29/6////.31/CFM-SF/.31/CFM-SF
 79
      29/7/////.31/CFM-SF
 80
      29/8/////.31/CFM-SF
 81
      29/9/////.31/CFM-SF
 82
      29/10/////.31/CFM-SF
 83
      29/11//////.31/CFM-SF
 84
      29/12//////.31/CFM-SF
 85
      29/13//////.31/CFM-SF
 86
      SYSTEM - 1
 87
      39/1/BASE BUILDING
 88
      40/1/PTAC
 89
      41/1/1/1
 90
      42/1/.2
      45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 91
 92
      40/2/RAD
 93
      41/2/1/2
 94
      45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
 95
      EQUIPMENT - 1
 96
      59/1/CARLISLE///BASE BUILDING
 97
      60/1/1/PKPLANT/1/1
      62/1/EQ1161/8
 98
 99
      65/1/1//2/2
      67/1/EQ2102/1
100
101
      69/1/EQ4003
      LOAD - 2
102
      19/2/WALL & ROOF INSULATION
103
      20/1/1/HALL/117/1/1/.8/.45/10.8//2
104
105
      20/2/1/LIVING ROOM/188/1/1/.8/.45/10.8//2
      20/3/1/FAMILY ROOM/255/1/1/.8/.45/10.8//2
106
107
      20/4/1/BEDROOM NO. 1/175/1/1/0//10.8//2
      20/5/1/BEDROOM NO. 2/189/1/1/0//10.8//2
108
109
      20/6/1/SEWING ROOM/218/1/1/0//10.8//2
110
      20/7/2/BATH/49/1/1/.8/.45/10.8//2
111
      20/8/2/KITCHEN/218/1/1/.8/.45/10.8//2
112
      20/9/2/DINING ROOM/184/1/1/.8/.45/10.8//2
113
      20/10/2/BATH/49/1/1/0//10.8//2
114
      20/11/2/BEDROOM NO. 3/184/1/1/0//10.8//2
115
      20/12/2/HALL/141/1/1/0//10.8//2
116
      20/13/2/BATH/39/1/1/0//10.8//2
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CONTENTS OF : E:\CB311.TM
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117
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       22/4/1/YES////177
118
119
       22/5/1/YES////177
120
       22/6/1/YES////177
121
       22/10/1/YES////177
122
       22/11/1/YES////177
123
       22/12/1/YES////177
124
       22/13/1/YES////177
125
       24/1/1/6/9.8//190/109
126
       24/2/1/15/9.8//190/19
127
       24/2/2/13/9.8//190/109
128
       24/3/1/11/9.8//190/19
129
       24/4/1/15/9.8//190/19
130
       24/4/2/13/9.8//190/109
131
       24/5/1/11/9.8//190/19
132
       24/6/1/7/9.8//190/289
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       24/7/1/7/9.8//190/289
134
       24/7/2/7/9.8//190/19
135
       24/8/1/7/9.8//190/289
136
       24/9/1/12/9.8//190/289
       24/9/2/15/9.8//190/19
137
138
       24/9/3/7/9.8//190/109
139
       24/10/1/7/9.8//190/289
140
       24/10/2/7/9.8//190/19
141
       24/11/1/12/9.8//190/289
142
       24/11/2/15/9.8//190/19
143
       24/11/3/7/9.8//190/109
144
       24/13/1/6/9.8//190/109
145
       25/1/1/3.6/1/1/1.04/1
146
       25/2/1/4/1.5/2/.55/.57
147
       25/2/2/4/1.5/2/.55/.57
       25/3/1/4.5/2.25/2/.55/.57
148
149
       25/4/1/4/1.5/2/.55/.57
150
       25/5/1/4.5/2.25/2/.55/.57
151
       25/6/1/4/1.5/1/.55/.57
152
       25/7/1/3/1.25/1/.55/.57
153
       25/8/1/3/1.25/1/.55/.57
154
       25/9/1/4/1.5/2/.55/.57
155
      25/9/2/4/1.5/2/.55/.57
156
       25/9/3/3.6/1/1/1.04/1
157
       25/10/1/4/1.5/1/.55/.57
158
       25/11/1/4/1.5/2/.55/.57
      25/11/2/4/1.5/2/.55/.57
159
160
       25/11/3/4/1.5/1/.55/.57
      25/13/1/4/1.5/1/.55/.57
161
162
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF/OFF
      27/M/502/SF-PERS/230/190/.5/WATT-SF/INCAND
163
164
      29/1////.26/CFM-SF/.26/CFM-SF
      29/2////.26/CFM-SF/.26/CFM-SF
165
      29/3////.26/CFM-SF/.26/CFM-SF
166
      29/4////.26/CFM-SF/.26/CFM-SF
167
      29/5////.26/CFM-SF/.26/CFM-SF
168
169
      29/6////.26/CFM-SF/.26/CFM-SF
      29/7/////.26/CFM-SF
170
171
      29/8/////.26/CFM-SF
172
      29/9/////.26/CFM-SF
173
      29/10//////.26/CFM-SF
174
      29/11/////.26/CFM-SF
```

```
CONTENTS OF : E:\CB311.TM
LINE #
175
       29/12/////.26/CFM-SF
176
       29/13/////.26/CFM-SF
177
       SYSTEM - 2
178
       39/2/WALL & ROOF INSULATION
179
       40/1/PTAC
180
       41/1/1/1
       42/1/.2
181
182
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
183
       40/2/RAD
184
       41/2/1/2
185
       45/2/OFF/OFF/OFF/OFF/CBLOHTG/OFF/OFF/OFF/OFF
186
       EQUIPMENT - 2
187
       59/2/CARLISLE///WALL & ROOF INSULATION
188
       60/1/1/PKPLANT/1/1
189
       62/1/E01161/8
190
       65/1/1//2/2
191
       67/1/EQ2102/1
192
       69/1/EQ4003
193
       LOAD - 3
194
       19/3/WEATHERSTRIP & CAULKING
195
       20/1/1/HALL/117/1/1/.8/.45/10.8//2
196
       20/2/1/LIVING ROOM/188/1/1/.8/.45/10.8//2
197
       20/3/1/FAMILY ROOM/255/1/1/.8/.45/10.8//2
       20/4/1/BEDROOM NO. 1/175/1/1/0//10.8//2
198
       20/5/1/BEDROOM NO. 2/189/1/1/0//10.8//2
199
200
       20/6/1/SEWING ROOM/218/1/1/0//10.8//2
201
       20/7/2/BATH/49/1/1/.8/.45/10.8//2
202
       20/8/2/KITCHEN/218/1/1/.8/.45/10.8//2
203
       20/9/2/DINING ROOM/184/1/1/.8/.45/10.8//2
204
       20/10/2/BATH/49/1/1/0//10.8//2
205
       20/11/2/BEDROOM NO. 3/184/1/1/0//10.8//2
206
       20/12/2/HALL/141/1/1/0//10.8//2
       20/13/2/BATH/39/1/1/0//10.8//2
207
208
      21/M///CBLQTX///CBLQTX
209
      22/4/1/YES////176
      22/5/1/YES////176
210
211
      22/6/1/YES////176
      22/10/1/YES////176
212
213
      22/11/1/YES////176
      22/12/1/YES////176
214
      22/13/1/YES////176
215
216
      24/1/1/6/9.8//178/109
217
      24/2/1/15/9.8//178/19
      24/2/2/13/9.8//178/109
218
      24/3/1/11/9.8//178/19
219
220
      24/4/1/15/9.8//178/19
      24/4/2/13/9.8//178/109
221
222
      24/5/1/11/9.8//178/19
      24/6/1/7/9.8//178/289
223
224
      24/7/1/7/9.8//178/289
225
      24/7/2/7/9.8//178/19
226
      24/8/1/7/9.8//178/289
227
      24/9/1/12/9.8//178/289
228
      24/9/2/15/9.8//178/19
229
      24/9/3/7/9.8//178/109
230
      24/10/1/7/9.8//178/289
231
      24/10/2/7/9.8//178/19
232
      24/11/1/12/9.8//178/289
```

```
CONTENTS OF : E:\CB311.TM
LINE #
233
       24/11/2/15/9.8//178/19
234
       24/11/3/7/9.8//178/109
235
       24/13/1/6/9.8//178/109
236
       25/1/1/3.6/1/1/1.04/1
237
       25/2/1/4/1.5/2/.55/.57
238
       25/2/2/4/1.5/2/.55/.57
239
       25/3/1/4.5/2.25/2/.55/.57
240
       25/4/1/4/1.5/2/.55/.57
241
       25/5/1/4.5/2.25/2/.55/.57
242
       25/6/1/4/1.5/1/.55/.57
243
       25/7/1/3/1.25/1/.55/.57
244
       25/8/1/3/1.25/1/.55/.57
       25/9/1/4/1.5/2/.55/.57
245
246
       25/9/2/4/1.5/2/.55/.57
247
       25/9/3/3.6/1/1/1.04/1
248
       25/10/1/4/1.5/1/.55/.57
249
       25/11/1/4/1.5/2/.55/.57
250
       25/11/2/4/1.5/2/.55/.57
251
       25/11/3/4/1.5/1/.55/.57
       25/13/1/4/1.5/1/.55/.57
252
253
       26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF
       27/M/502/SF-PERS/230/190/.5/WATT-SF/INCAND
254
255
       29/1////.25/CFM-SF/.25/CFM-SF
256
       29/2////.25/CFM-SF/.25/CFM-SF
257
       29/3////.25/CFM-SF/.25/CFM-SF
258
       29/4////.25/CFM-SF/.25/CFM-SF
259
       29/5////.25/CFM-SF/.25/CFM-SF
260
       29/6////.25/CFM-SF/.25/CFM-SF
261
       29/7//////.25/CFM-SF
262
       29/8//////.25/CFM-SF
263
      29/9/////.25/CFM-SF
264
      29/10//////.25/CFM-SF
      29/11/////.25/CFM-SF
265
266
      29/12//////.25/CFM-SF
267
      29/13/////.25/CFM-SF
268
      SYSTEM - 3
269
      39/3/WEATHERSTRIP & CAULKING
270
      40/1/PTAC
271
      41/1/1/1
272
      42/1/.2
      45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
273
274
      40/2/RAD
      41/2/1/2
275
      45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
276
      EQUIPMENT - 3
277
      59/3/CARLISLE///WEATHERSTRIP & CAULKING
278
      60/1/1/PKPLANT/1/1
279
      62/1/EQ1161/8
280
      65/1/1//2/2
281
282
      67/1/EQ2102/1
      69/1/EQ4003
283
284
      LOAD - 4
285
      19/4/COMBINED ECOS
286
      20/1/1/HALL/117/1/1/.8/.45/10.8//2
287
      20/2/1/LIVING ROOM/188/1/1/.8/.45/10.8//2
288
      20/3/1/FAMILY ROOM/255/1/1/.8/.45/10.8//2
289
      20/4/1/BEDROOM NO. 1/175/1/1/0//10.8//2
      20/5/1/BEDROOM NO. 2/189/1/1/0//10.8//2
290
```

```
CONTENTS OF : E:\CB311.TM
LINE #
291
       20/6/1/SEWING ROOM/218/1/1/0//10.8//2
292
       20/7/2/BATH/49/1/1/.8/.45/10.8//2
 293
       20/8/2/KITCHEN/218/1/1/.8/.45/10.8//2
294
       20/9/2/DINING ROOM/184/1/1/.8/.45/10.8//2
295
       20/10/2/BATH/49/1/1/0//10.8//2
296
       20/11/2/BEDROOM NO. 3/184/1/1/0//10.8//2
297
       20/12/2/HALL/141/1/1/0//10.8//2
298
       20/13/2/BATH/39/1/1/0//10.8//2
299
       21/M///CBLQTX///CBLQTX
300
       22/4/1/YES////177
301
       22/5/1/YES////177
       22/6/1/YES////177
302
303
       22/10/1/YES////177
304
       22/11/1/YES////177
305
       22/12/1/YES////177
306
       22/13/1/YES////177
307
       24/1/1/6/9.8//190/109
308
       24/2/1/15/9.8//190/19
309
       24/2/2/13/9.8//190/109
310
       24/3/1/11/9.8//190/19
311
       24/4/1/15/9.8//190/19
312
       24/4/2/13/9.8//190/109
313
       24/5/1/11/9.8//190/19
       24/6/1/7/9.8//190/289
314
315
       24/7/1/7/9.8//190/289
316
       24/7/2/7/9.8//190/19
317
       24/8/1/7/9.8//190/289
       24/9/1/12/9.8//190/289
318
319
       24/9/2/15/9.8//190/19
320
       24/9/3/7/9.8//190/109
321
       24/10/1/7/9.8//190/289
       24/10/2/7/9.8//190/19
322
323
       24/11/1/12/9.8//190/289
324
       24/11/2/15/9.8//190/19
325
      24/11/3/7/9.8//190/109
      24/13/1/6/9.8//190/109
326
      25/1/1/3.6/1/1/1.04/1
327
328
      25/2/1/4/1.5/2/.55/.57
329
      25/2/2/4/1.5/2/.55/.57
      25/3/1/4.5/2.25/2/.55/.57
330
      25/4/1/4/1.5/2/.55/.57
331
      25/5/1/4.5/2.25/2/.55/.57
332
333
      25/6/1/4/1.5/1/.55/.57
334
      25/7/1/3/1.25/1/.55/.57
335
      25/8/1/3/1.25/1/.55/.57
336
      25/9/1/4/1.5/2/.55/.57
337
      25/9/2/4/1.5/2/.55/.57
      25/9/3/3.6/1/1/1.04/1
338
339
      25/10/1/4/1.5/1/.55/.57
340
      25/11/1/4/1.5/2/.55/.57
341
      25/11/2/4/1.5/2/.55/.57
      25/11/3/4/1.5/1/.55/.57
342
343
      25/13/1/4/1.5/1/.55/.57
      26/M/CBLQP/CBLQL/OFF//OFF/CBLQCLG/OFF/OFF/OFF
344
345
      27/M/502/SF-PERS/230/190/.5/WATT-SF/INCAND
      29/1////.20/CFM-SF/.20/CFM-SF
346
347
      29/2////.20/CFM-SF/.20/CFM-SF
```

29/3////.20/CFM-SF/.20/CFM-SF

348

```
CONTENTS OF : E:\CB311.TM
LINE # ---
 349
       29/4////.20/CFM-SF/.20/CFM-SF
       29/5////.20/CFM-SF/.20/CFM-SF
 350
 351
       29/6////.20/CFM-SF/.20/CFM-SF
 352
       29/7/////.20/CFM-SF
 353
       29/8/////.20/CFM-SF
 354
       29/9/////.20/CFM-SF
 355
       29/10//////.20/CFM-SF
       29/11/////.20/CFM-SF
 356
 357
       29/12/////.20/CFM-SF
 358
       29/13/////.20/CFM-SF
 359
       SYSTEM - 4
       39/4/COMBINED ECOS
 360
 361
       40/1/PTAC
 362
       41/1/1/1
 363
       42/1/.2
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
364
 365
       40/2/RAD
 366
      41/2/1/2
      45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
 367
      EQUIPMENT - 4
368
      59/4/CARLISLE///COMBINED ECOS
369
370
      60/1/1/PKPLANT/1/1
      62/1/EQ1161/8
371
      65/1/1//2/2
372
      67/1/EQ2102/1
373
374
      69/1/EQ4003
```

Building 311 (Typical for 312)

Trace Output File

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

```
**
             **
   TRACE
      600 ANALYSIS
**
**
   bv
**
******************************
```

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 311

Weather File Code:

CARL ISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude:

40.2 (deg)

Longitude:

77.2 (deg)

Time Zone:

5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

Summer Design Wet Bulb:

Winter Design Dry Bulb:

72 (F)

Summer Ground Relectance:

4 (F)

Winter Ground Relectance:

0.20 0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (8tu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4.790.2 (Btu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

9: 4:19 1/20/94

Dataset Name:

CB311 .TM

AIRFLÓW - ALTERNATIVE 1 BASE BUILDING

			Main			Auxil.	Room
System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 PTAC	0	1,512	1,512	2,065	553	0	0
2 RAD	0	0	0	0	1,215	0	0
Totals	0	1,512	1,512	2,065	1,768	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

(Design Capacity Quantities)

System Number	System	Main Sys. Capacity	Aux. Sys.	ling Opt. Vent Capacity (Tons)									
1	PTAC RAD	3.7	0.0	0.0	3.7	-61,780 -130,219	0	0	0	0	0	(Btuh) -61,780 -130,219	
Totals		3.7	0.0	0.0	3.7	-191,998	0	0	0	0	. 0	-191,998	

The building peaked at hour 16 month 7 with a capacity of 3.6 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

Percent ----- Cooling ---- Heating ---Cfm/ Cfm/ Sq Ft 8tuh/ Cfm/ Btuh/ Floor Area Sq Ft - Ton /Ton Sq Ft Sq Ft Sq Ft Outside System Main/ System Air Number Auxiliary Type 0.00 0.66 408.6 617.3 19.44 0.66 -27.05 2,284 Main PTAC 0.0 0.00 0.00 0.0 0.00 0.00 -32.46 4,012 Main RAD

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

eaked at Time	: ==> >	Mo/Hr: 7		۸		* M				Mo/Hr:		
JUSTQE HIT ==	> UA	אא/אאי/אטו: א	11/ 13/ 98.	U		* (	JADB:	91	<b>S</b>	OADB:	4	
	Space	Ret. Air	Ret. Air	Net	Percnt	* 5	Space	Percnt *	Space Pe	ak Coil	Peak	Perci
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	* Sens	sible	Of Tot *	Space Se		Sens	Of To
nvelope Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* ({	Btuh)	(%) *	: (Btu	ih) (	Btuh)	(1
Skylite Solr	0	0		0	0.00		0	0.00			0	0.0
Skylite Cond		0		0	0.00	*	0	0.00			0	0.0
Roof Cond		0		6,822	15.37	* (	6,644	20.18	-5,4	42 -	5,442	8.1
Glass Solar	5,105	0		5,105	11.50	* 5	3,381	16.35			0	0.0
Glass Cond	1,277	0		1,277	2.88	*	,271	3.86	-6,4			10.
Wall Cond		245		5,973	13.45	* 5	,737	17.43 *	-10,3	55 -1	0,787	17.
Partition				0			0	0.00			0	0.
Exposed Floo	r 0			0	0.00	*	0	0.00 *		0	0	0.
Infiltration	21,611			21,611	48.67	* 8	3,842	26.86	-38,5	08 -3	8,508	62.
Sub Total==>	40,544	245		40,789	91.86	* 27	,875	84.67 *	-60,7	49 -6	1,182	100.
nternal Loads			•			*		*				
Lights	1,998	0		1,998	4.50	* 2	2,418	7.35 *		0	0	0.
People	1,400			1,400	3.15	*	770	2.34 *		0	0	0.
Misc	0	0	0	0	0.00	*	0	0.00 *		0	0	0.
Sub Total ==>	3,397	0	0	3,397	7.65	* 3	,188	9.68 *		0	0	0.
iling Load	483	-483		0	0.00		.859	5.65 *		38	0	0.
tside Air		0	0	0	0.00		0	0.00 *		0	0	0.
p. Fan Heat				215	0.48	*		0.00 *			0	0.
t. Fan Heat		0		0	0.00			0.00 *			0	0.
ct Heat Pkup		0		. С	0.00			0.00 *		•	0	0.
/UNDR Sizing				0	0.00		0	0.00 *		0	0	0.
haust Heat		0	0	0	0.00	*		0.00 *			0	0.
rmihal Bypas	S	0	0	0	0.00	*		0.00 *			0	0.
and Total==>	44,425	-239	0	44,401	100.00	* 32	.922	* 100.00 *	-62,2	87 <b>-6</b>	1.182	100.
l l	al Capacity										ass (sf	
	s) (Mbh)								Floor		155 (5)	.) (**
	.7 44.4					-	_		Part			
1 -	.0 0.0	0.0			.0 0.		0.0			0		
Vent 0		0.0	Ö		.0 0.		0.0		Roof			۸
als 3	.7 44.4	V. V	v	V.V V		0.0	0.0	0.0	Wall	1,784		
нга	TING COIL SELE	FCTTON		ΔΤΩ	ELOWS (cf	·m \		ENGINEERING	CHECKS	TEMPE	0.711056	. (E)_
Capa		irfl Ent			Cooling	"', Heating		g % OA	0.0	Type	Clg	, ,
	oh) (cfi			Vent	0	incating 0		g Cfm/Sqft		SADB		105
n Htg -				Infil	553	553		g Cfm/3qit g Cfm/Ton		Plenum	75.8	
Htg						1,512		g Sqft/Ton		Return	75.3	
heat -				Mincfm	0	1,312		g Btuh/Sqft		Ret/OA	75.3	
1						1,512		. People				
i		0 0.0		Exhaust	0	1,312		g % OA		Runarnd		
idi#	U U	0.0	V. U	EXHAUSL	v	U	กเ	y 6 UH	V.V	Fn MtrT	0.0	) 0
idif						٨				En 01 474	۸ ۸	
Vent	0.0		0.0	Rm Exh Auxil	0	0	Ht	g Cfm/SqFt g Btuh/SqFt	0.66	Fn BldT Fn Fric		

System 2 Block RAD - RADIATION

Peaked at Time ==> Mo/Hr: 0/0 * Mo/Hr: 13/1 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 OADB: 0 OAD8: 4 Net Percht * Space Percht * Space Peak Coil Peak Percht Space Ret. Air Ret. Air 0 0.00 * 0 0 0.00 0 0.00 * 0 0 0.00 0 0.00 * -9,303 -9,303 7.14 0 0.00 * 0 0 0.00 0 0 0 0 0 0 0 0 Glass Solar 0 0.00 * -12,241 -12,241 9.40 0 0.00 * -23,096 -24,041 18.46 0 0.00 * 0 0.00 *
0 0.00 * 0 0.00 *
0 0.00 * 0 0.00 *
0 0.00 * 0 0.00 *
0 0.00 * 0 0.00 *
0 0.00 * 0 0.00 *
0 0.00 * 0 0.00 * Glass Cond 0 0 Wall Cond Partition
Exposed Floor
Infiltration 0 0.00 * 0 0 0.00 0 0.00 * 0 0 0.00 0 0 0.00 * -84,633 -84,633 64.99 -129,273 -130,219 100.00 0 0 Sub Total ==> * * Internal Loads 0 0 0 0 Lights People Misc 0 0 0 0 0 Sub Total==> 0 0 0 0 Ceiling Load 0 0 0 Outside Air 0 0 0 0.00 * 0 0.00 0 0.00 * Sup. Han Heat 0 0.00 0.00 * 0 0.00 * 0 0.00 Ret. Han Heat 0 0.00 * 0.00 * Duct Heat Pkup 0 0.00 * 0 0 0 0 0.00 * 0 0 0 0.00 * 0 0.00 0.00 * OV/UNDR Sizing 0.00 * 0 0.00 Exhaust Heat Terminal Bypass 0.00 * 0.00 * * Grand | Total == > 0 0 0 0 0 0.00 * -138,251 -130,219 100.00 0.00 * Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) 
 (Mbh)
 (Mbh)
 (cfm)
 Deg F Deg F Grains
 Deg r De (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,012 Main Clg 0.0 0.0 Aux Clg Opt Vent 0.0 0.0 Totals LVg

Deg F Deg F

O 0.0 0.0 0.0

O 0 0 0 0 0 0 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg Main Htg -130.2 Aux Hta Preheat Reheat 0.0 Humidif Opt Vent 0.0
Total -130.2

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- BUILDING U-VALUES------

i					Roc	m U-Val	ues				Room	Room
;					(Btu	i/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.105	0.549	10.3	4.58
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	17.8	6.19
\$	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	9.2	4.34
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	25.1	7.97
5	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	16.0	6.04
. 6	SEWING ROOM	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	14.5	5.71
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.073	0.570	0.584	0.105	0.549	15.3	5.77
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.073	0.570	0.584	0.105	0.549	15.3	5.77
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.105	0.549	10.3	4.58
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	17.8	6.19
\$	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	9.2	4.34
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	25.1	7.97
\$	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	16.0	6.04
6	SEWING ROOM	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	14.5	5.71
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.570	0.584	0.105	0.549	15.3	5.77
7	BATH	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	30.0	8.80
8	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	8.8	4.26
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.514	0.631	0.105	0.549	20.7	6.81
10	BATH	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	35.4	10.18
11	BEDROOM NO. 3	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	26.4	8.25
12	HALL	0.000	0.000	0.000	0.000	0.073	0.000	0.000	0.000	0.000	12.0	5.17
13	BATH	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	23.8	7.70
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.073	0.573	0.587	0.105	0.549	19.0	6.55
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.073	0.572	0.586	0.105	0.549	16.9	6.10
Buildin	g	0.000	0.000	0.000	0.000	0.073	0.571	0.585	0.105	0.549	16.3	5.98

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

: :				Floor	Total		Exposed						
1		Numbi	er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	HALL	1	2	117	234	0	0	0	0	0	7	6	110
2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
5	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
System	1 Total/Ave.			•	2,284	0	0	0	0	1,164	172	10	1,611
1	HALL	1	2	117	234	0	0	0	0	0	7	6	110
2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
\$	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
7	BATH	1	2	49	98	0	0	0	0	0	. 8	3	267
8	KITCHEN	1	2	218	436	0	0	0	0	0	8	5	130
9	DINING ROOM	1	2	184	368	0 -	0	0	0	0	55	8	611
10	BATH	1	2	49	98	0	0	0	0	98	12	4	262
11	BEDROOM NO. 3	1	2	184	368	0	0	0	0	368	60	9	<b>6</b> 06
12	HALL	1	2	141	282	0	0	0	0	282	0	0	0
13	BATH	1	2	39	78	0	0	0	0	78	12	10	106
Zone	2 Total/Ave.				1,728	0	0	0	0	826	154	7	1,982
System	2 Total/Ave.				4,012	0	0	0	0	1,990	326	8	3,594
Buildir	ng				6,296	0	0	0	0	3,154	499	9	5,205

ASHRAE 90 ANALYSIS - ALTERNATIVE 1

BASE BUILDING

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.145 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.120 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 11.71 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

-----SYSTEM LOAD PROFILE ------

System Totals

Percei	ἡt	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Desig	ġn	Cap.	Hours	Hours	Capacity	Hours		Cap.	Hours	Hours	Cap.	Hours	Hours
Loa		(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
^		0.0	,	(0	0 (00		2/7	75 /	0	0	0.0	0	٨
0 -	5	0.2	,	62	-9,600	5	263	75.6	0	0	0.0	0	۷
	10	0.4	3	30	-19,200	10	473	151.2	U	U	0.0	0	0
10 -	15	0.6	4	39	-28,800	16	762	226.8	0	0	0.0	0	0
15 -	20	0.7	7	62	-38,400	15	703	302.4	42	1,530	0.0	0	0
20 -	.25	0.9	8	72	-48,000	18	874	377.9	0	0	0.0	0	0
25 -	30	1.1	11	98	-57,599	16	764	453.5	0	0	0.0	0	0
30 -	35	1.3	18	156	-67,199	13	624	529.1	0	0	0.0	0	0
35 -	40	1.5	10	85	-76,799	7	357	604.7	0	0	0.0	0	0
40 -	45	1.7	9	76	-86,399	0	0	680.3	0	0	0.0	0	0
45 -	50	1.9	11	98	-95,999	0	0	755.9	21	765	0.0	0	0
50 -	55	2.0	3	31	-105,599	0	0	831.5	0	0	0.0	0	0
55 -	60	2.2	2	20	-115,199	0	0	907.1	0	0	0.0	0	0
60 -	65	2.4	0	0	-124,799	0	0	982.7	0	0	0.0	0	0
65 -	70	2.6	3	31	-134,399	0	0	1,058.2	0	0	0.0	0	0
70 -	75	2.8	0	0	-143,999	0	0	1,133.8	0	0	0.0	. 0	0
75 -	80	3.0	0	0	-153,599	0.	0	1,209.4	0	0	0.0	0	0
80 -	85	3.1	0	0	-163,199	0	0	1,285.0	0	0	0.0	0	0
85 -	90	3.3	0	0	-172,798	0	0	1,360.6	0	0	0.0	0	0
90 -	95	3.5	0	0	-182.398	0	0	1,436.2	0	0	0.0	0	0
95 - 1	00	3.7	3	31	-191,998	0	0	1,511.8	38	1,377	0.0	0	0
Hours	Off	0.0	0	7,869	. 0.	. 0	3,940	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

					B U I L D I N	G TEMPE	RATURE	PROFI	L E S	 	
							Zana Numb			 	
Temper	Range (F)	1	1	2			- Zone Numb	er			
Max.	Temp.	81.6 100	.9 10	02.1							
MÇ	./Hr.	7 14 7	21	7 21							
	Type	1	1	1							
			• • • •		• • • • • • • • • • • • • • • • • • • •		Number of H	iours		 	
	/e 100			120							
95	- 100	0 1,0		916							
90		0 1,0	51 1.	,072							
85	- 90	0 5	14	618							
80	- 85	0 8	102	845							
75	- 80	2,633 1	.80	101							
I		1,007	0	0							
65	- 70	49 5,0	88 5	,088							
		567	0	0							
55		918	0	0							
50		550	0	0							
Be l	ow 50	3,036	0	0							
Min.	Temp.	31.7 67	.9	67.9		•					
Me	./Hr.	2 9 1	8	29							
	Type	4	2	1							

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1

BASE BUILDING

;	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(k₩)	(Therm)	(Thrm/hr)
Jan	835	3	423	1
Feb	755	3	424	1
March	856	3	284	1
April	805	3	132	0
May	898	8	0	0
June	1,327	9	0	0
July	1,839	9	0	0
Aug	1,323	9	0	0
Sept	855	9	0	0
0ct	845	3	106	0
Nov	805	3	199	1
Dec	825	3	352	1
Total	11,966	9	1,919	1

Building Energy Consumption = **36,973** (Btu/Sq Ft/Year) Source Energy Consumption = 60,110 (Btu/Sq Ft/Year)

Floor Area = 6,296 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

	Equip						_	umption -						
m	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
)	LIGHTS			***	207	0.17	004	007	054	0.0.7	047	007	007	0.057
	ELEC	833	753	854	803	843	824	823	854	803	843	803	823	9,857 3.1
	PK	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	MISC LD									_				
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD						_				•	^		^
	OIL	0	0	0	0	0	0	0	0	0	0 0.0	0 0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD						•	•	۸	^	٨	۸	٨	0
	P STEAM	0	0	0	0	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0.0	0.0
	PK	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0,0
	MISC LD									•	•	٨	^	
	HOTH20	0	0	0	0 <b>0</b> .0	0	0	0 0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>V.</b> V
	NISC LD	٨	^	Δ.		^	^	^	^	^	۸	٥	٨	0
	P CHILL	0 0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0 <b>0</b> .0	0 0.0	0.0
	PK	0.0					0.0	0.0	0.0	0.0	V. V	0.0	•.•	3.0
	EQ1161	^		CLD COND			7.1.7	7/4	711	۸	٨	٨	۸	1,418
	ELEC	0.0	0.0	0 0.0	0.0	- 0 4.4	343 5.0	764 5.1	311 5.0	0 4.8	0 0.0	0 0.0	0.0	5.1
	PK	0.0				4.4	3.0	J.1	3.0	4.0	0.0	V.V	0.0	3.1
	EQ5200	^		ENSER FA		^	77	77	70	^	. ^	٨	0	145
	ELEC	0	0.0	0 0.0	0 0.0	0 0.0	35 0.5	77 0.5	32 0.5	0 0.3	0.0	0 0.0	0.0	0.5
	PK	0.0	0.0	0.0	0.0	0.0	. 0.3	0.3	0.5	0.5	0.0	0.0	V.V	
	EQ5303		CONT		^	^	70	101	70	•	٨	۸		265
	ELEC	0	0	0	0	0 0.3	72 0.3	121 0.3	72 0.3	0 0.3	0 0.0	0 0.0	0 0.0	0.3
	PK	0.0	0.0	0.0	0.0	0.5	0.5	0.3	0.5	0.3	0.0	0.0	0.0	0.5
	EQ4003			ENTRIF.									•	0/3
	ELEC	0	0	0	0	54	52	54	54	52	0	0	0	267
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
	EQ2102 PURCHASED DIST. HOT WATER													
	P HOTH20	423	424	284	132	0	0	0	0	0	106	199	352	1,919
	PK	0.8	0.8	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.7	0.8

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1

BASE BUILDING

ELEC 2 14 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 1

BASE BUILDING

-----UTILITY PEAK CHECKSUMS-----

Utility ELECTRIC DEMAND										
Peak Value Yearly Time of	9.2 Peak 16	(kW) (hr)	7 (mo)							
Hour 16 Month	7									

Eqp.			Utility	Percnt
Ref.	Equipment		Demand	Of Tot
Num.	Code Name	Equipment Description	(kW)	(%)

## Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	5.9	64.25
Sub Total			5.9	64.25
Sub Total			0.0	0.00
Air Moving	Equipment			

1	SUMMATION OF FAN ELECTRICAL DEMAND	0.1	1.41
Sub To	tal	0.1	1.41
Sub To	tal	0.0	0.00
Miscel	laneous		

Miscel	laneous	٠.			
Light	S			3.1	34.33
	Utilities			0.0	0.00
Misc	Equipment			0.0	0.00
Sub To				3.1	34.33
Grand	Total	•	-	9.2	100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 311

CARLISLE Weather File Code: ENERGY SAVINGS OPPORTUNITY STUDY Location: Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 92 (F) Summer Design Dry Bulb: Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 0.0742 (Lbm/cuft) Air Density: Air Specific Heat: 0.2444 (Btu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (8tu-min./hr/cuft) 4.4519 (Lb-min./hr/cuft) Enthalpy Factor: To September Design Simulation Period: May System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:18: 2 1/20/94

Dataset Name: CB311 .TM

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

------ SYSTEM SUMMARY ------ (Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	PTAC	0	1,029	1,029	1,493	464	0	0
2	RAD	0	0	0	0	1,019	0	0
Totals		0	1,029	1,029	1,493	1,483	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

(Design Capacity Quantities)

System System Number Type	Capacity	Aux. Sys. Capacity			Main Sys. Capacity (Btuh)		Preheat Capacity (Btuh)	Heating	Humidif. Capacity (Btuh)	Opt. Vent	Heating Totals (Btuh)
1 PTAC	2.7	0.0	0.0	2.7	-45,675	0	0	0	0	0	<b>-45,67</b> 5
2 RAD	0.0	0.0	0.0	0.0	-96,917	0	0	0	0	0	-96,917
Totals	2.7	0.0	0.0	2.7	-142,591	0	0	0	0	. 0	-142,591

The building peaked at hour 16 month 7 with a capacity of 2.6 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- ENGINEERING CHECKS -----

			Percent		Cooli	ing		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
	Main	PTAC	0.00	0.45	379.2	841.5	14.26	0.45	-20.00	2,284
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-24.16	4,012

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

 Peaked at Time == >
 Mo/Hr: 7/16
 * Mo/Hr: 7/16
 * Mo/Hr: 13/1

 Outside Air == >
 OADB/WB/HR: 91/73/98.0
 * OADB: 91
 * OADB: 4

 Peaked at Time ==> mo/m: 7/10
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 | Space | Ret. Air | Ret. Air | Net | Percnt | Space | Percnt | Space | Percnt | Space | Percnt | Space | Space | Sens. + Lat. | Sensible | Latent | Total | Of Tot | Sensible | Of Tot | Space | Spac Internal Loads Ceiling Load Outside Air 

 Sup. Fan Heat
 146
 0.45 *
 0.00 *

 Ret. Fan Heat
 0
 0.00 *
 0.00 *

 Duct Heat Pkup
 0
 0.00 *
 0.00 *

 0V/UNDR Sizing
 0
 0.00 *
 0.00 *

 Exhaust Heat
 0
 0
 0.00 *
 0.00 *

 Terminal Bypass
 0
 0
 0.00 *
 0.00 *

 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0.00 * Grand Total==> 32,560 -135 0 32,571 100.00 * 23,507 100.00 * -46,050 -45,399 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 2,284 Main Clg 2.7 32.6 22.1 1,029 75.2 63.3 70.3 53.9 52.5 57.9 Part 0
Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 -----AIRFLOWS (cfm)------ --ENGINEERING CHECKS-- --TEMPERATURES (F)---Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.45 SADB 54.0 109.1 Main Htg -45.7 1,029 68.3 109.1 Infil 464 464 Clg Cfm/Ton 379.22 Plenum 75.4 67.6 Aux Htg 0.0 0 0.0 0.0 Supply 1,029 1,029 Clg Sqft/Ton 841.48 Return 75.1 67.8 Preheat -0.0 1,029 67.8 53.9 Mincfm 0 0 Clg Btuh/Sqft 14.26 Ret/OA 75.1 67.8 Reheat 0.0 0 0.0 0.0 Return 1,029 1,029 No. People 5 Runarnd 75.0 68.0 Humidi 0.0 0 0.0 0.0 Exhaust 0 0 Htg % OA 0.0 Fn MtrTD 0.0 0.0 Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Stuh/Sqft 0.45 Fn BldTD 0.0 0.0 Total -45.7

System 2 Block RAD - RADIATION

	t Time ==>		OOLING COIL Mo/Hr: 0				*	Mo	Hr:	0/0 *		Mo/Hr: 13	/ 1	
			D8/WB/HR:		•		*		NDB:	0 *		OADB:	4	
:		Space	Ret. Air	Ret. Air	N	et Pe	rent *	Sp	ace	Percnt *	Space Pe	ak Coil P	eak	Perc
	Se	ns.+Lat.	Sensible	Latent	Tot	al Of	Tot *	Sensi	ble	Of Tot *	Space Se	ns Tot S	ens	Of T
velope	Loads	(Btuh)	(8tuh)	(8tuh)	(Btu	h)	(%) *	(81	tuh)	(%) *	(Btu	h) (Bt	uh)	(
Skylit		0	0			0	0.00 *		0	0.00 *		0	0	0.
	e Cond	0	0			0	0.00 *		0	0.00 *		0	0	0.
Roof C		0	0			0	0.00 *		0	0.00 *	-3,7	80 -3,	780	3.
Glass		0	0			0	0.00 *		0	0.00 *		0	0	0
Glass		0	0			0	0.00 *		0	0.00 *	-12,2	41 -12,	241	12.
Wall C		0	0			0	0.00 *	•	0	0.00 *	-9,5	17 -9,	913	10.
Partit		0				0	0.00 *		0	0.00 *		0	0	0.
	d Floor	0					0.00 *		0	0.00 *		0	0	0
	ration	0					0.00 *		0	0.00 *	-70,9	B3 -70,	983	73.
:	tal==>	0	0				0.00 *	•	0	0.00 *	,	21 -96,		100
	Loads	•	·	•			*			*				
Lights		0	0			0	0.00 *		0	0.00 *		0	0	0
People		0	v				0.00 *		0	0.00 *		0	0	0
Misc		Ō	0	0			0.00 *		0	0.00 *		0	0	0
	tal==>	Ö	Ŏ	0			0.00 *		0	0.00 *		0	0	0
iling		0	0	•			0.00 *		0	0.00 *		49	0	0
tside		0	0	0			0.00 *		0	0.00 *		0	0	0
p. Fan		J	v	•			0.00 *		•	0.00 *			0	0
t. Fan			. 0				0.00 *			0.00 *			0	0
,	t Pkup		0				0.00 *			0.00 *		•	0	0
	Sizing	0	•				0.00 *		0	0.00 *		0	0	0
haust		v	0	0			0.00 *		-	0.00 *			0	0
	Bypass		Õ	0			0.00 *			0.00 *			0	0
· minal	0,0000		v			-	*			*				
and To	tal==>	0	0	. 0	•	0	0.00 *		0	0.00 *	-100,4	69 -96,	917	100
				ING COIL SE	LECTION-					o luo luo		AREAS		
			Sens Cap.							B/WB/HR			s (sf	) (
	(Tons)	(Mbh)	(Mbh)	(cfm)		_	Grains	Deg F	veg f	Grains		4,012		
n Clg	0.0	0.0	0.0	0.	0.0					0.0	Part			
Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		^
Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,990	7.	0
als	0.0	0.0									Wall	3,920	37	26
	*		ECTION					)		ENGINEERING g % OA	CHECKS 0.0	TEMPERA Type	TURES Clg	(F) H
	Capacity				Type .	L00	ling	Heating 0		g Cfm/Sqft	0.00	SADB	0.0	
- 0	(Mbh)	(cf			Vent		0	1,019		g Cfm/Sqrt g Cfm/Ton	0.00	Plenum	0.0	
n Htg	-96.9		0 0.0	0.0	Infil		0			-	0.00	Return	0.0	6
Htg	0.0		0.0	0.0	Supply		0	0		g Sqft/Ton		Ret/OA	0.0	6
heat	0.0		0 0.0	0.0	Mincfm		0	0		g Btuh/Sqft	0.00	Runarnd		6
eat	0.0		0 0.0	0.0	Return		0	0		. People			0.0	
idit	0.0		0 0.0	0.0	Exhaust		0	0		g % OA	0.0	Fn MtrTD	0.0	
: Vent	0.0	)	0.0	0.0	Rm Exh		0	0	Ht	g Cfm/SqFt	0.00	Fn BldTD	0.0	
al	-96.9				Auxil		0	0		g Btuh/SqFt	-24.16	Fn Frict	0.0	

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

------ BUILDING U-VALUES -----

						m U-Val					Room	Room
0					,	ı/hr/sq1		612 - 4			Mass	Capac.
Room	N	01	F #1	Summr	Wintr		Summr	Wintr	W 11	0 '1	(1b/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	saft)	sqft/F)
1	HALL	0 000	0 000	0 000	0 000	0 000	1 040	1 00/	0 047	A 540	0 (	4 05
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.043	0.549	8.6	4.25
7	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	13.2	5.26
3	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	8.0	4.10
i4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	20.8	7.13
5	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	15.4	5.91
6	SEWING ROOM	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	14.5	5.70
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.030	0.570	0.584	0.043	0.549	13.3	5.38
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.030	0.570	0.584	0.043	0.549	13.3	5.38
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.043	0.549	8.6	4.25
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	13.2	5.26
3	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	8.0	4.10
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	20.8	7.13
5	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	15.4	5.91
6	SEWING ROOM	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	14.5	5.70
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.030	0.570	0.584	0.043	0.549	13.3	5.38
7	BATH	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	20.4	6.89
8	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	7.7	4.05
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.614	0.631	0.043	0.549	14.9	5.65
10	BATH	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	27.0	8.51
11	BEDROOM NO. 3	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	21.6	7.30
12	HALL	0.000	0.000	0.000	0.000	0.030	0.000	0.000	0.000	0.000	13.0	5.37
13	BATH	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	20.1	6.95
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.030	0.573	0.587	0.043	0.549	15.4	5.84
System	2 Total/Ave.	0.000	0.000	.0.000	0.000	0.030	0.572	0.586	0.043	0.549	14.2	5.58
Buildin	•	0,000	0.000	0.000	0.000	0.030	0.571	0.585	0.043	0.549	13.9	5.50

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

------ BUILDING AREAS ------

				Floor	Total		Exposed						
			er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupli		Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
						_					_		
1	HALL	1	2	117	234	0	0	0	0	0	1	6	110
. 2	LIVING ROOM	1	2	188	376	0	. 0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
5	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
System	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
i	HALL	1	2	117	234	0	0	0	0	0	7	6	110
2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
5	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
7	BATH	1	2	49	98	0	0	0	0	0	. 8	3	267
8	KITCHEN	1	2	218	436	0	0	0	0	0	8	5	130
9	DINING ROOM	1	2	184	368	0	0	0	0	0	55	8	611
10	BATH	1	2	49	98	0	0	0	0	98	12	4	262
1	BEDROOM NO. 3	1	2	184	368	0	0	0	0	368	60	9	606
12	HALL	1	2	141	282	0	0	0	0	282	0	0	0
13	BATH	1	2	39	78	0	0	0	0	78	12	10	106
Zone	2 Total/Ave.				1,728	0	0	0	0	826	154	7	1,982
System	2 Total/Ave.				4,012	0	0	0	0	1,990	326	8	3,594
Buildir					6,296	0	0	0	0	3,154	499	9	5,205

ASHRAE 90 ANALYSIS - ALTERNATIVE 2

WALL & ROOF INSULATION

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.030 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.089 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof overall Thermal Transfer Value (OTTVr) = 1.68 (8tu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 9.22 (8tu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals

Perce	nt	Cool	ling Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflo	
Desi	gn	Cap.	Hours	Hours	Capacity	Hours		Cap.	Hours		Cap.	Hours	Hours
Lo	a <b>d</b>	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 -	5	0.1	6	58	-7,130	7	309	51.5	0	0	0.0	0	0
5 -	10	0.3	14	131	-14,259	10	469	102.9	0	0	0.0	0	0
10 -	15	0.4	6	53	-21,389	18	864	154.4	0	0	0.0	0	0
15 -	20	0.5	3	28	-28,518	14	640	205.9	42	1,530	0.0	0	0
20 -	25	0.7	4	42	-35,648	18	842	257.3	0	0	0.0	0	0
25 -	30	0.8	10	92	-42,777	16	757	308.8	0	0	0.0	0	0
30 -	35	0.9	16	154	<b>-4</b> 9,907	14	678	360.3	0	0	0.0	0	0
35 -	40	1.1	5	47	-57,036	4	179	411.7	0	0	0.0	0	0
40 ~	45	1.2	8	77	-64,166	0	0	463.2	0	0	0.0	0	0
45 -	50	1.4	13	121	-71,296	0	0	514.7	21	765	0.0	0	0
50 -	55	1.5	6	56	-78,425	0	0	566.1	0	0	0.0	0	0
55 -	60	1.6	2	20	-85,555	0	0	617.6	0	0	0.0	0	0
60 -	65	1.8	2	20	-92,684	0	0	669.0	0	0	0.0	0	0
65 -	70	1.9	0	0	-99,814	0	0	720.5	0	0	0.0	0	0
70 -	75	2.0	3	31	-106.943	0	0	772.0	0	0	0.0	0	0
75 -	80	2.2	0	0	-114,073	0	0	823.4	0	0	0.0	0	0
80 -	85	2.3	0	0	-121,202	0	0	874.9	0	0	0.0	0	0
85 -	90	2.4	0	0	-128,332	0	0	926.4	0	0	0.0	0	0
90 -	95	2.6	0	0	-135,462	0	0	977.8	0	0	0.0	0	0
	100	2.7	3	31	-142,591	0	0	1,029.3	38	1,377	0.0	0	0
Hours	Off	0.0	0	7,799	. 0.	. 0	4,022	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
WALL & ROOF INSULATION

				BUILDING TEMPERATURE PROFILES	~
Temperature				Zone Number	
Range (F)	1	1	2		
Max. Temp.	80.8 1	05.3	106.5		
Mo./Hr.	7 14				
Day Type	1	1			
Above 100	0 1	,268	1,256		
95 - 100			1,128		
90 - 95	0	492			
85 - 90	0	276	497		
80 - 85	0	334	431	·	
75 - 80	2,720	252	0		
70 - 75	952	34	0		
65 - 70	85 5	,054	5,088		
60 - 65	578	0	0		
55 - 60	996	0	0		
50 - 55	491	0	0		
Below 50	2,938	0	0		
Min. Temp.	33.2	67.9	67.9		
Mb./Hr.	2 9	4 1	2 17		
Day Type	4	2	2		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	835	3	302	1
Feb	754	3	309	1
March	855	3	203	0
April	804	3	92	0
May	880	3	0	0
June	1,231	7	0	0
July	1,647	8	0	0
Aug	1,236	7	0	0
Sept	838	7	. 0	0
Oct	844	3	60	0
Nov	804	3	136	0
Dec	824	3	247	0
Total	11,554	8	1,350	1

Building Energy Consumption = 27,713 (Btu/Sq Ft/Year) Source Energy Consumption = 47,391 (Btu/Sq Ft/Year)

Floor Area = 6,296 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION------ EQUIPMENT ENERGY

ar I rain					Mank	hlu Cana							
ef Equip um Code	Jan	Feb	Mar	Apr	mont May	June	umption - July	Aug	Sep	Oct	Nov	Dec	Total
O LIGHTS		7.5	05.4	007	0.17	004	007	054	007	0.47	007	007	0.067
ELEC PK	833 3.1	753 3.1	854 3.1	803 3.1	843 3.1	824 3.1	823 3.1	854 3.1	803 3.1	843 3.1	803 3.1	823 3.1	9,857 3.1
1 MISC LD													
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 MISC LD	^	^	^	. ^	^	٥	٨	۸	٨	٨	٨	۸	0
ĢAS ₽K	0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	V.V	0.0	0.0	0.0	0.0	0.0	0.0	• • • • • • • • • • • • • • • • • • • •	***	• • • • • • • • • • • • • • • • • • • •
3 MISC LD OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 MISC LD													
P STEAM	0	0	0	0.0	0	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 MISC LD P HOTH20	٥	۸	^	۸	۸	0	0	0	٥	0	0	0	0
P K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0
6 NISC LD													
8 CHILL	0	0	0 .	. 0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 EQ1161		AIR-	CLD COND	COMP <1	5 TONS								
ELEC	0	0	0	0	0	265	595	246	0	0	0	0	1,106
PK	0.0	0.0	0.0	0.0	0.0	3.6	3.8	3.6	3.5	0.0	0.0	0.0	3.8
1 EQ5200	•		ENSER FAI		•	07		0.5	^	. ^	Α.	٥	117
ELEC PK	0 0.0	0.0	0.0	0 0.0	0 0.0	27	60 0.4	25 0.4	0 0.1	0.0	0.0	0 0.0	113 0.4
1 EQ5303		CONT	eui s										
ELEC	0	0	0	0	0	79	133	74	0	0	0	0	286
PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1 EQ4003		FC C	ENTRIF. 1	FAN C.V.									
ELEC	0	0	0	0	37	36	37	37	36	0	0	0	182
PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1 EQ2102			HASED DI				_						
P HOTH20	302	309	203	92	0	0	0	0	0	60	136	247	1,350
PK	0.6	0.6	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.5	0.6
1 895020		HEAT	WATER C	IRC. PUM	P C.V.								

Trane Air Condi By: Trane Custo	-		Network										V 600 Page 23
EQUIPMENT ENERG		ION - AL	TERNATIV	E 2									
ELEC	2 0.0	0.0	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2 0.0	2 0.0	10 0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2

Lights

Sub Total

Grand Total

Base Utilities

Misc Equipment

3.1 41.22

7.6 100.00

0.0

0.0

0.00

41.22

0.00

WALL & ROOF INSULATIO	n N		
	UTILITY PEAK	CHEC	K S U M :
Utility ELECTRIC DE	MAND		
Peak Value 7.6 Yearly Time of Peak			
Hour 16 Month 7			
Eqp. Ref. Equipment Num. Code Name	Equipment Description		Percnt Of Tot (%)
Cooling Equipment			
1 EQ1161	AIR-CLD COND COMP <15 TONS	4.4	57.63
Sub Total		4.4	57.63
Sub Total		0.0	0.00
Air Moving Equipment			
1	SUMMATION OF FAN ELECTRICAL DEMAND	0.1	1.15
Sub Total		0.1	1.15
Sub Total		0.0	0.00
Miscellaneous	•		

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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************************* ******************* ** ** TRACE 600 ANALYSIS ** ** ** ************************ *********************

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 311

CARLISLE Weather File Code: Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (dea) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) 1.00 Summer Clearness Number: Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) 4 (F) Winter Design Dry Bulb: Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 0.0742 (Lbm/cuft) Air Density: Air Specific Heat: 0.2444 (8tu/lbm/F) 1.0882 (Btu-min./hr/cuft/F) Density-Specific Heat Prod: 4,790.2 (8tu-min./hr/cuft) Latent Heat Factor: Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September

System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

9:31:59 1/20/94 Time/Date Program was Run: Dataset Name: CB311 .TM

AIRFLOW - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

> ----- SYSTEM SUMMARY -----(Design Airflow Quantities)

Auxil. ----- Main -----Room Return Exhaust Supply Exhaust Heating Outside Cooling Airflow Airflow Airflow Airflow Airflow Airflow System System (Cfm) (Cfm) (Cfm) (Cfm) Number Type (Cfm) (Cfm) (Cfm) 0 0 0 1,411 1,411 1,857 446 1 PTAC 980 0 2 RAD 0 0 0 0 0 1,411 0 1,411 1,857 1,426 0 Totals

CAPACITY - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

(Design Capacity Quantities)

System Number	System	7- 1	Aux. Sys.			Main Sys. Capacity (Btuh)		Preheat Capacity (Btuh)	Heating Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (8tuh)
	PTAC	3.4	0.0	0.0	3.4	-54,391	0	0	0	0	0	-54,391
2	RAD	0.0	0.0	0.0	0.0	-113,838	0	0	0	0	. 0	-113,838
Totals		3.4	0.0	0.0	3.4	-168,229	0	0	0	0	0	-168,229

The building peaked at hour 16 month 7 with a capacity of 3.3 tons

ENGINEERING CHECKS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- E N. G I N E E R I N G C H E C K S -----

ļ			Percent		Cooli	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
	Main Main	PTAC RAD	0.00	0.62	418.3	677.3 0.0	17.72 0.00	0.62	-23.81 -28.37	2,284 4,012

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

Peaked at Time Dutside Air ==	==> > OA	Mo/Hr: 7 DB/WB/HR: 9	7/16 91/ 73/ 98.0	)		* *		7/16 * 91 *		0/Hr: 13/ 1 0ADB: 4	
	Space		Ret. Air	Net						Coil Peak	
	Sens.+Lat.	Sensible		Total			Sensible		•		
Envelope Loads			(Btuh)	(Btuh)	(%)		(8tuh)				• .
Skylite Solr		0		0			(				
Skylite Cond	V	0		0			0	*		0	
Roof Cond		0		6,822	16.86		6,644				
Glass Solar	5,105	0		5,105	12.62		5,381		0	0	
Glass Cond	1,277	0		1,277	3.16		1,271			-6,444	
Wall Cond	5,728	244		5,972	14.76		5,737			-10,787	
Partition	0			0			0			0	
Exposed Floo				0			0			0	
Infiltration	,			17,694			7,130			-31,055	
Sub Total==>	36,627	244		36,871			26,164		-	-53,728	100.0
Internal Loads								*			
Lights	1,998	0		1,998	4.94		2,418			0	0.0
People	1,400			1,400	3.46		770			0	0.0
Misc	0	0	0	0	0.00		0			0	0.00
Sub Total==>		0	0	3,397			_ 3,188			0	0.0
Ceiling Load		-517		0	0.00		1,949			0	0.0
Outside Air	0	0	0	0	0.00		0			0	0.0
Sup. Fan Heat				201	0.50			0.00 *		0	0.0
Ret. Fan Heat		0		0	0.00			0.00 *		. 0	0.0
ouct Heat Pkup		0		. 0	0.00			0.00 *		0	0.0
DV/UNDR Sizing	0		•	0	0.00		0	.,		0	0.0
xhaust Heat		0	0	0	0.00			0.00 *		0	0.0
Terminal Bypass		Ü	0	0	0.00	*		0.00 *		V	0.0
Grand Total==>	40,542	-273	. 0	40,470	100.00	*	31,301		-54,909	-53,728	100.0
			THE COTE SE	FCT10N						-ARFAS	
									Gross Total		
	s) (Mbh)							F Grains	Floor 2,		, (.,
in Clg 3.									Part		
ix Clg 0.		0.0	0			.0		.0 0.0	ExFlr	0	
t Vent 0.		0.0	0			. 0		.0 0.0		164	0
tals 3.											172 1
HEAT	ING COIL SELE	ECTION		AIR	FLOWS (c	fm)		ENGINEERING	CHECKS	-TEMPERATURE	S (F)
Capac					Cooling			Clg % OA		Type Clo	
(Mb	-			Vent	0		0	Clg Cfm/Sqft			6 103.
	1,4	411 68.3	103.8	Infil	446		446	Clg Cfm/Ton		lenum 75.	
ıx Htg	0.0	0.0	0.0	Supply	1,411		1,411	Clg Sqft/Ton	677.25 R	eturn 75.	.3 67.
i =	0.0 1,	411 67.6	54.5	Mincfm	0		0	Clg Btuh/Sqft	17.72 R	et/OA 75.	.3 67.
	0.0	0.0	0.0	Return	1,411		1,411	No. People	5 R	unarnd 75.	.0 68.
4	0.0	0.0	0.0	Exhaust	0			Htg % OA		n MtrTD 0.	.0 0.
1	0.0	0.0	0.0	Rm Exh	0			Htg Cfm/SqFt	0.62 F	n BldTD 0.	.0 0.
	64.4			Auxil	0		0	Htg Btuh/SqFt		n Frict 0.	.1 0.

System 2 Block RAD - RADIATION

	i at Time =		Mo/Hr:	0/0					/Hr: 0	/ 0 *		Mo/Hr: 1		
Outsi	de Air ==>	0	ADB/WB/HR:	0/ 0/	0.0		,	. 04	AD8:	0 *		0AD8:	4	
		Space	Ret. Air	Ret. Ai	r	Net P	ercnt 4	Sı	pace	Percnt *	Space Pea	ak Coil	Peak	Percnt
		Sens.+Lat.	Sensible	. Laten	t Io	tal 0	f Tot 1			Of Tot *	Space Ser	ns Tot	Sens	Of Tot
Envelo	pe Loads	(Btuh)	(Btuh)	(Btuh	) (Bt	cuh)	(%) >	(B1	tuh)	(%) *	(8tul	n) (8	tuh)	(\$)
	ite Solr	0	0	)		0	0.00	:	0	0.00 *		0	0	0.00
Skyl	lite Cond	0	0	)		0	0.00	1	0	0.00 *		0	0	0.00
Root	Cond	0	C	)		0	0.00		0	0.00 *	-9,30	)3 -9	,303	8.17
Glas	ss Solar	0	C	)		0	0.00	:	0	0.00 *		0	0	0.00
Glas	ss Cond	0	0	)		0	0.00	:	0	0.00 *	-12,24	11 -12	,241	10.75
Wall	Cond	0	C	)		0	0.00	:	0	0.00 *			,041	21.12
Part	cition	0				0	0.00	:	0	0.00 *		0	0	0.00
Expo	sed Floor	0				0	0.00	ł	0	0.00 *		0	0	0.00
Infi	ltration	0				0	0.00		0	0.00 *		3 -68		59.96
Sub	Total==>	0	C	) .		0	0.00	:	0	0.00 *	-112,89	93 -113	,838	100.00
nterr	nal Loads			•			*	;		*				
Ligh	nts	0	C	)		0	0.00	:	0	0.00 *		0	0	0.00
Peo	ole	0				0	0.00	:	0	0.00 *		0	0	0.00
Misc	:	Ü	C	) (	0	0	0.00	:	0	0.00 *		0	0	0.00
Sub	Total==>	0	0	) (	0	0	0.00	1	0	0.00 *		0	0	0.00
eili	ng Load	0	0	)		0	0.00		0	0.00 *	-8,97	78	0	0.00
utsi	de Air	0	0	) (	0	0	0.00		0	0.00 *		0	0	0.0
up. F	an Heat					0	0.00			0.00 *			0	0.00
et. F	an Heat		0	)		0	0.00			0.00 *			0	0.00
	leat Pkup		0	)	•	0	0.00			0.00 *		_	0	0.00
v/un¢	R Sizing	0				0	0.00		0	0.00 *		0	0	0.00
	st Heat		0	) (	0	0	0.00			0.00 *			0	0.00
ermiț	nal Bypass		0	) (	0	0	0.00			0.00 *			0	0.00
						_				*	101.0	,, ,,,	0.70	100 0
rand	Total==>	0	0	· (	0 ' -	0	0.00		0	0.00 *	-121,8	11 -113	,838	100.00
			coc											
			Sens Cap.								Gross Tota		ss (sf	) (%)
			(Mbh)									4,012		
			0.0	(	0.0						Part			
x Cl			0.0		0.0	0.0	0.0		0.0	0.0	ExFlr	0		
t Ver			0.0	(	0.0	0.0	0.0	0.0	0.0	0.0		1,990		0 (
tals	0.0	0.0					•				Wall	3,920	3	26
	HEATI	NG COIL SE	LECTION		*****	-AIRFLO	JWS (cfm	)	E	NGINEERING	CHECKS	TEMPER	ATURES	(F)
	Capaci	ty Coil (	Airfl Ent	Lvg	Type		oling	Heating		% 0A	0.0	Type	Clg	Htg
	(Mbh	) (c.	fm) Deg F	Deg F	Vent		ō	0	Clg	Cfm/Sqft	0.00	SAD8	0.0	68.
in Ht	g -113	.8	0.0		Infil		0	980		Cfm/Ton	0.00	Plenum	0.0	
x Ht	g 0	.0	0 0.0	0.0	Supply		0	0	_	Sqft/Ton	0.00	Return	0.0	
eheat	0	.0	0 0.0	0.0	Mincfm		0	0	_	Btuh/Sqft	0.00	Ret/OA	0.0	
heat	0	.0	0 0.0	0.0	Return		0	0		People	0	Runarnd	0.0	
midif	0	.0	0.0	0.0	Exhaust	;	0	0		% OA	0.0	Fn MtrT0		
t Ven	lt 0	.0	0 0.0	0.0	Rm Exh		0	0	Hta	Cfm/SqFt	0.00	Fn 81dT0	0.0	0.0
								-						

BUILDING U-VALUES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- BUILDING U-VALUES ------

		Room U-Values									Room	Room
					(Btu	ı/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	₩all	Ceil.	sqft)	sqft/F)
	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.105	0.549	10.3	4.58
. 2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	17.8	6.19
3	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	9.2	4.34
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	25.1	7.97
5	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	16.0	6.04
. 6	SEWING ROOM	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	14.5	5.71
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.570	0.584	0.105	0.549	15.3	5.77
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.570	0.584	0.105	0.549	15.3	5.77
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.105	0.549	10.3	4.58
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	17.8	6.19
3	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	9.2	4.34
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	25.1	7.97
\$	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	16.0	6.04
6	SEWING ROOM	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	14.5	5.71
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.570	0.584	0.105	0.549	15.3	5.77
7	BATH	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	30.0	8.80
8	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.105	0.549	8.8	4.26
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.614	0.631	0.105	0.549	20.7	6.81
10	BATH	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	35.4	10.18
11	BEDROOM NO. 3	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	26.4	8.25
12	HALL	0.000	0.000	0.000	0.000	0.073	0.000	0.000	0.000	0.000	12.0	5.17
13	BATH	0.000	0.000	0.000	0.000	0.073	0.550	0.563	0.105	0.000	23.8	7.70
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.573	0.587	0.105	0.549	19.0	6.55
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.572	0.586	0.105	0.549	16.9	6.10
Buildir	ng .	0.000	0.000	0.000	0.000	0.073	0.571	0.585	0.105	0.549	16.3	5.98

BUILDING AREAS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Area (sqft)
į	HALL	1	2	117	234	0	0	0	0	0	7	6	110
2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
5	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
. 6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
System	1 Total/Ave.			•	2,284	0	0	0	0	1,164	172	10	1,611
1	HALL	1	2	117	234	0	0	0	0	0	7	6	110
2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
\$	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
ò	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	<ol> <li>Total/Ave.</li> </ol>				2,284	0	0	0	0	1,164	172	10	1,611
1	BATH	1	2	49	98	0	0	0	0	0	. 8	3	267
8	KITCHEN	1	2	218	436	0	0	0	0	0	8	5	130
9	DINING ROOM	1	2	184	368	0	0	0	0	0	55	8	611
10	BATH	1	2	49	98	0	0	0	0	98	12	4	262
11	BEDROOM NO. 3	1	2	184	368	0	0	0	0	368	60	9	606
12	HALL	1	2	141	282	0	0	0	0	282	0	0	0
13	BATH	1	2	39.	78	0	0	0	0	78	12	10	106
Zone	2 Total/Ave.				1,728	0	0	0	0	826	154	7	1,982
System	2 Total/Ave.				4,012	0	0	0	0	1,990	326	8	3,594
Buildi					6,296	0	0	0	0	3,154	499	9	5,205

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.145 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.120 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 11.71 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

## System Totals

Percei	nt	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Desi	gn	Cap.		Hours	Capacity		Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Lo	-	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 -	5	0.2	7	64	-8,411	5	251	70.5	0	0	0.0	0	0
5 -	10	0.3	5	50	-16,823	11	521	141.1	0	0	0.0	0	0
10 -	15	0.5	6	59	-25,234	14	654	211.6	0	0	0.0	0	0
15 -	20	0.7	7	69	-33,646	15	701	282.2	42	1,530	0.0	0	0
20 -	25	0.8	4	41	-42,057	19	903	352.7	0	0	0.0	0	0
25 -	30	1.0	5	51	-50,469	16	758	423.3	0	0	0.0	0	0
30 -	35	1.2	16	157	-58,880	13	604	493.8	0	0	0.0	0	0
35 -	40	1.3	16	150	-67,292	7	338	564.3	0	0	0.0	0	0
40 -	45	1.5	7	66	-75,703	0	0	634.9	0	0	0.0	0	0
45 -	50	1.7	15	143	-84,115	0	0	705.4	21	765	0.0	0	0
50 ~	55	1.9	3	31	-92,526	0	0	776.0	0	0	0.0	0	0
55 -	60	2.0	2	20	-100,937	0	0	846.5	0	0	0.0	0	0
60 -	65	2.2	0	0	-109,349	0	0	917.1	0	0	0.0	0	0
65 -	70	2.4	0	0	-117,760	0	0	987.6	0	0	0.0	0	0
70 -	75	2.5	0	0	-126,172	0	0	1,058.1	0	0	0.0	0	0
75 -	80	2.7	3	31	-134,583	0.	0	1,128.7	0	0	0.0	0	0
80 -	85	2.9	0	0	-142,995	0	0	1,199.2	0	0	0.0	0	0
85 -	90	3.0	0	0	-151,406	0	0	1,269.8	0	0	0.0	0	0
90 -	95	3.2	0	0	-159,818	0	0	1,340.3	0	0	0.0	0	0
95 -	100	3.4	3	31	-168,229	Û	0	1,410.9	38	1,377	0.0	0	0
Hours		0.0	0	7,797	0	. 0	4,030	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

		BUILDING TEMPERATURE PROFILES
!		
Temperature		Zone Number
Range (F)	1 1 2	
Max. Temp.	81.5 100.9 102.1	
Mo./Hr.	7 14 7 21 7 21	
Day Type	1 1 1	
Above 100	0 75 120	
95 - 100	0 1,050 916	
90 - 95	0 1,051 1,072	
85 - 90	0 514 618	
80 - 85	<b>0 8</b> 02 845	
75, - 80	2,846 180 101	
70 ¹ - 75	826 0 0	
65 - 70	<b>5</b> 1 5,088 5,088	
60 - 65	711 0 0	
55 - 60	782 0 0	
50 - 55	<b>5</b> 53 0 0	
Below 50	2,991 0 0	
Min. Temp.	<b>32.</b> 5 67.9 67.9	
Mo./Hr.	2 9 3 18 3 19	
Day Type	4 1 1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ MONTHLY ENERGY CONSUMPTION -------

	ELEC	DEMAND	HOT WTR HO	T W DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	Tḥrm/hr)
Jan	835	3	369	1
Feb	754	3	367	1
March	856	3	243	1
April	804	3	106	0
May	894	8	0	0
June	1,354	9	0	. 0
July	1,817	9	0	0
Aug	1,338	8	0	0
Sept	852	8	0	0
Oct	845	3	88	0
Nov ,	805	3	173	0
Dec	825	3	309	1
Total	11,977	9	1.654	1

Building Energy Consumption = 32,766 (8tu/Sq Ft/Year) Source Energy Consumption =

54,511 (Btu/Sq Ft/Year)

Floor Area =

6,296 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION------

PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
ELEC 833 753 854 803 843 824 823 854 803 843 803 82 PK 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1	
PK 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1	2 0 057
ELEC PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
2 MISC LD GAS QAS QAS QAS QAS QAS QAS QAS QAS QAS Q	0 0.0
GAS	
PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	
OIL	0.0
PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0 0
P STEAM	
NISC LD	
5 MISC LD P HOTH20	0 0.0
P HOTH20	
6 MISC LD  P CHILL  O O O O O O O O O O O O O O O O O O	0 0
P CHILL 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0
eK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0 0
1 EQ1161 AIR-CLD COND COMP <15 TONS	
ELEC 0 0 0 0 0 363 742 326 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1,430 0 4.7
	0 146
O.O O.O O.O O.O O.O O.4 O.4 O.4 O.2 O.O O.O	0 0.4
1 EQ5303 CONTROLS	000
ELEC 0 0 0 0 0 81 127 74 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 282 0 0.3
	0 249
PK 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.0 0.0	0.1
1 EQ2102 PURCHASED DIST. HOT WATER P HOTHOD 369 367 243 106 0 0 0 0 88 173 30	9 1,654
Р НОТН2О 369 367 243 106 0 0 0 0 0 88 173 30 ФК 0.7 0.7 0.5 0.3 0.0 0.0 0.0 0.0 0.0 0.3 0.4 0	
1 EQ5020 HEAT WATER CIRC. PUMP C.V.	

1	Trane Air Conditioning Economics By: Trane Customer Direct Service Network												
EQUIPMENT ENER WEATHERSTRIP &		ION - AL	TERNATIV	E 3									
ELEC PK	0.0	2	2	1	0.0	0.0	0.0	0.0	0.0	1 0.0	2	2	12 0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

-----UTILITY PEAK CHECKSUMS------

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 8.7 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utilit Deman Equipment Description (kW	
Cooling Ed	quipment		
-1	EQ1161	AIR-CLD COND COMP <15 TONS 5.	62.28
Sub Total		5.	62.28
Sub Total		0.	0.00
Air Moving	Equipment		
1 :		SUMMATION OF FAN ELECTRICAL DEMAND 0.	1.39
Sub Total		0.	1.39
Sub Total		0.	0.00
Miscellane	0US		
Lights Base Util Misc Equi Sub Total		3. 0. 0. 3.	0.00
Grand Tota	1	8.	100.00

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 311

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (dea) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September

Time/Date Program was Run: 9:46: 3 1/20/94

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Dataset Name: CB311 .TM

System Simulation Period: January To December

AIRFLÓW - ALTERNATIVE 4 COMBINED ECOS

-----SYSTEM SUMMARY ------(Design Airflow Quantities)

				Auxil.	. Room		
System System Number Type	4	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 PTAC	0	1,013	1,013	1,370	357	0	0
2 RAD	0	0	0	0	784	0	0
Totals	0	1.013	1,013	1,370	1,141	0	0

CAPACITY - ALTERNATIVE 4
COMBINED ECOS

System		-		Opt. Vent	Cooling Totals		Aux. Sys. Capacity	Preheat Capacity	Heating Reheat Capacity	Humidif. Capacity	Heating Totals	
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(8tuh)	(8tuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
i	PTAC	2.4	0.0	0.0	2.4	-38,237	0	0	0	0	0	-38,237
2	RAD	0.0	0.0	0.0	0.0	-80,536	0	0	0	0	0	-80,536
Totals		2.4	0.0	0.0	2.4	-118,773	0	0	0	0	0	-118,773

The building peaked at hour 16 month 7 with a capacity of 2.4 tons

ENGINÉERING CHECKS - ALTERNATIVE 4 COMBINED ECOS

------ ENGINE ERING CHECKS ------Percent ----- Cooling ----- Heating ---Btuh/ Cfm/ Btuh/ Floor Area System Main/ System Outside Cfm/ Cfm/ Sa Ft Sq Ft Sq Ft Sq Ft Sq Ft Ton /Ton Sq Ft Number Auxiliary Type Air 416.5 939.2 12.78 0.44 -16.74 PTAC 0.00 0.44 2,284 Main 0.00 0.00 -20.07 4,012 RAD 0.0 0.0 Main 0.00 0.00

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

utside Air ==>	::> NA	Mo/Hr: ∶ Ne/we/he:		)		Mo/				o/Hr: 13/ 1 OADB: 4	
	OH.	DO   110   111   1	,1, 10, ,0.	,	,	ζ.		*		311901 1	
	Space		Ret. Air	Net				Percnt *			Perc
	Sens.+Lat.	Sensible		Total				Of Tot *	•		Of T
nvelope Loads		(8tuh)		(Btuh)				(%) *		(Btuh)	(
•	0	0		0			0	0.00 *		0	
Skylite Cond	0	0		0				0.00 *		0	
Roof Cond	2,707	0		2,707			661		-2,211		
Glass Solar	5,237	0		5,237			997			0	0.
Glass Cond	1,287	0		1,287				6.11 *			
Wall Cond	2,358	105		2,462			286	10.52 *	•		
Partition	0			. 0	0.00			0.00 *		0	
Exposed Floor	0			0	0.00			0.00 *		0	
Infiltration	13,414			13,414	45.96	5,	824	26.79 *		-24,844	
Sub Total==>	25,003	105		25,107		17,	097	78.65 *	-37,766	-37,946	100
ternal Loads					1			*			
Lights	2,414	0		2,414	8.27	2,	864	13.18 *	0	0	0
People	1,518			1,518				3.52 *	0	0	0
Misc	. 0	0	0	0		:	0	0.00 *	0	0	0
Sub Total:=>	3,932	0	0	3,932			629	16.70 *	0	0	0
iling Load		-256		0				4.65 *		0	0
tside Air	0	0		0	0.00		0	0.00 *		0	0
p. Fan Heat			-	144	0.49			0.00 *		0	0
t. Fan Heat		0		0				0.00 *		0	0
ct Heat Pkup		0		0	0.00			0.00 *		0	0
/UNDR Sizing	0	-		0			0	0.00 *		0	0
haust Heat	· ·	0	0	0				0.00 *		0	0
rminal Bypass		0	0	0				0.00 *		0	0
iminal bypass		v	•	•	3			*		•	•
and Total==>	29,191	-152	0	29,184	100.00	21,	738	100.00 *	-38,605	-37,946	100
	,		•	•							
	1.0										
									Gross Total		, .
	) (Mbh)							Grains		284 .	
n Clg 2.									Part	-	
Clg 0.		0.0	0		0.0		0.0	0.0	Exflr	0	۸
Vent 0.		0.0	0	0.0	0.0	0.0	0.0	0.0		164	0
als 2.	4 29.2								Wall 1,	784	172
HEAT	ING COIL SEL	ECTION		AIA	RFLOWS (cfr	1)	8	ENGINEERING	CHECKS	-TEMPERATURE	S (F)
Capac		irfl Ent			Cooling	Heating		3 % OA		Type Clg	
(Mb				Vent	0	0		Cfm/Sqft			3 10
n Htg -3		-	_	Infil		357		cfm/Ton		lenum 75.	
Htg			0.0	Supply	1,013	1,013		Sqft/Ton		eturn 75.	
heat -			55.1	Mincfm	0	. 0	_	Btuh/Sqft		et/OA 75.	
eat				Return		1,013		. People		unarnd 75.	
	0.0	0 0.0		Exhaust	0	0		3 % OA		n MtrTD 0.	
	v . v	0 0.0	414		v	v	1105	, ,	- 1 4		
Vent		0 0.0	0.0	Rm Exh	0	0	H+/	g Cfm/SqFt	0 44 F	n BldTD 0.	. 0

RAD System 2 - RADIATION **Block** 

eaked at			Mo/Hr:					*		łr: 0	•		Mo/Hr:	•	
Outside Ai	r ::>	0A	DB/WB/HR:	0/ 0/	0.0			*	DAC	)B:	0 *		OADB:	4	
		Space	Ret. Ai	r Ret. Ai	r	Net 1	Percnt	*	Spa	ce	Percnt *	Space Pea	k Coil	Peak	Perci
·	Sen	s.+Lat.	Sensible	e Laten	t T	otal (	of Tot	*	Sensit	ole	Of Tot *	Space Ser	ns Tot	Sens	Of To
nvelope Lo		(Btuh)	(Btuh	) (Btuh	) (8	tuh)	(%)	*	(Btu	ıh)	(%) *	(Btul	1) (	Btuh)	(5
Skylite S		0		0	•	0	0.00	*		0	0.00 *		0	0	0.0
Skylite (		0		)		0	0.00	*		0	0.00 *		0	0	0.0
Roof Cond		0	(	)		0	0.00	*		0	0.00 *	-3,78	30 -	3,780	4.6
Glass So	lar	0		0		0	0.00	*		0	0.00 *		0	0	0.6
Glass Cor	nd	0	•	)		0	0.00	*		0	0.00 *	-12,24	11 -1:	2,241	15.2
Wall Cond	d	0		0		0	0.00	*		0	0.00 *		.7 -	9,913	12.3
Partition	n	0			•	0	0.00	*		0	0.00 *		0	0	0.0
Exposed (	Floor	0				0	0.00	*		0	0.00 *		0	0	0.
Infiltrat	tion	0				0	0.00	*		0	0.00 *	-54,60	2 -5	4,602	67.8
Sub Total	]::>	0	(	)		0	0.00	*		0	0.00 *				100.
nternal Lo	oads							*			*				
Lights		0	(	0		0	0.00	*		0	0.00 *		0	0	0.
People		0				0	0.00	*		0	0.00 *		0	0	0.
Misc		0	1	)	0	0	0.00	*		0	0.00 *		0	0	0.
Sub Total	l::>	0		)	0	0	0.00	*		0	0.00 *		0	0	0.
iling Loa	ad	0		0		0	0.00	*		0	0.00 *	-3,94	9	0	0.
tside Ai	r	0		)	0	0	0.00	*		0	0.00 *		0	0	0.
ip. Fan He	eat					0	0.00	*			0.00 *			0	0.
et. Fan He	eat			)		0	0.00	*			0.00 *			0	0.
ct Heat 1	Pkup		!	)		0	0.00	*			0.00 *			0	0.
//UNDR Si	zing	C				0	0.00	*		0	0.00 *		0	0	0.
khaust Hea	at			0	0	0	0.00	*			0.00 *			0	0.
erminal By	ypass		4	)	0	0	0.00	*			0.00 *			0	0.
								*			*				
and Total	]::>	0	(		0	0	0.00	*		0	0.00 *	-84,08	39 -8	0,536	100.
			co	OLING COIL											
			Sens Cap.									Gross Tota		ass (s	f) (%
			(Mbh)				F Grai				Grains		4,012		
n Clg	0.0	0.0	0.0		0.0	0.0	0	.0			0.0	Part	0		
Clg	0.0	0.0	0.0		0.0			.0	0.0	0.0	0.0	ExFlr	0		
: Vent	0.0	0.0	0.0		0.0	0.0	0	.0	0.0	0.0	0.0		1,990		0
als	0.0	0.0										Wall	3,920		326
	-HEATING	COIL SEL	ECTION			AIRF	LOWS (c	fm)-		E	NGINEERING	CHECKS	TEMPE	RATURES	s (F)-
	Capacity	Coil A	irfl Ent	Lvg	Type	C	ooling	Н	eating	Clg	% DA	0.0	Type	Clg	Ht
	(Mbh)	(cf	m) Degi	F Deg F	Vent		0		0	Clg	Cfm/Sqft	0.00	SADB	0.0	68
in Htg	-80.5		0 0.	0.0	Infil		0.		784	Clg	Cfm/Ton	0.00	Plenum	0.6	67
⟨ Htg	0.0		0 0.	0.0	Supply		0		0	Clg	Sqft/Ton	0.00	Return	0.0	68
eheat	0.0		0 0.	0.0	Mincfm		0		0	Clg	Btuh/Sqft	0.00	Ret/OA	0.0	68
heat	0.0		0 0.	0.0	Return		0		0	No.	People	0	Runarnd	0.0	68
midif	0.0		0 0.	0.0	Exhaus	t	Ō		0	Htg	% OA	0.0	Fn MtrT	D 0.	0 0
			Λ Λ		Om Cub		0		0	Hta	Cfm/SqFt	0.00	Fn BldT	D 0.0	0 0
t Vent	0.0		0 0.	0.0	Rm Exh		v		V	nry	CIM/ SQLL	0.00	Lii Diai	U V.	0

BUILDING U-VALUES - ALTERNATIVE 4 COMBINED ECOS

----- BUILDING U-VALUES-----

•		Room U-Values										Room
		(Btu/hr/sqft/F)									Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(1b/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.043	0.549	8.6	4.25
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	13.2	5.26
3	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	8.0	4.10
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	20.8	7.13
5	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	15.4	5.91
6	SEWING ROOM	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	14.5	5.70
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.030	0.570	0.584	0.043	0.549	13.3	5.38
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.030	0.570	0.584	0.043	0.549	13.3	5.38
1	HALL	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.043	0.549	8.6	4.25
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	13.2	5.26
3	FAMILY ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	8.0	4.10
4	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	20.8	7.13
5	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	15.4	5.91
6	SEWING ROOM	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	14.5	5.70
Zone '	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.030	0.570	0.584	0.043	0.549	13.3	5.38
7	BATH	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	20.4	6.89
8	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.043	0.549	7.7	4.05
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.614	0.631	0.043	0.549	14.9	5.65
10	8ATH	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	27.0	8.51
11	BEDROOM NO. 3	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	21.6	7.30
12	HALL	0.000	0.000	0.000	0.000	0.030	0.000	0.000	0.000	0.000	13.0	5.37
13	BATH	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.043	0.000	20.1	6.95
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.030	0.573	0.587	0.043	0.549	15.4	5.84
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.030	0.572	0.586	0.043	0.549	14.2	5.58
Buildin	9	0.000	0.000	0.000	0.000	0.030	0.571	0.585	0.043	0.549	13.9	5.50

BUILDING AREAS - ALTERNATIVE 4 COMBINED ECOS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	HALL	1	2	117	234	0	0	0	0	0	7	6	110
2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0 .	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
5	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
System	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
1	HALL	1	2	117	234	0	0	0	0	0	7	6	110
- 2	LIVING ROOM	1	2	188	376	0	0	0	0	0	48	9	501
3	FAMILY ROOM	1	2	255	510	0	0	0	0	0	41	19	175
4	BEDROOM NO. 1	1	2	175	350	0	0	0	0	350	24	4	525
5	BEDROOM NO. 2	1	2	189	378	0	0	0	0	378	41	19	175
6	SEWING ROOM	1	2	218	436	0	0	0	0	436	12	9	125
Zone	1 Total/Ave.				2,284	0	0	0	0	1,164	172	10	1,611
7	BATH	1	2	49	98	0	0	0	0	0	8	3	267
8	KITCHEN	1	2	218	436	0	0	0	0	0	8	5	130
9	DINING ROOM	1	2	184	368	0	0	0	0	0	55	8	611
10	BATH	1	2	49	98	0	0	0	0	98	12	4	262
11	BEDROOM NO. 3	1	2	184	368	0	0	0	0	368	60	9	606
12	HALL	1	2	141	282	0	0	0	0	282	0	0	0
13	BATH	1	2	39	78	0	0	0	0	78	12	10	106
Zone	<pre>2 Total/Ave.</pre>			•	1,728	0	0	0	. 0	826	154	7	1,982
System	2 Total/Ave.				. 4,012	0	0	0	0	1,990	326	8	3,594
Buildin	g				6,296	0	0	0	0	3,154	499	9	5,205

ASHRAE 90 ANALYSIS - ALTERNATIVE 4 COMBINED ECOS

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.030 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.089 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.68 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 9.22 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 COMBINED ECOS

## System Totals

Percent	Cooling Load		Heati	ng Load		Cooling	Airflow		Heating	Airflow		
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.1	6	62	-5,939	7	318	50.6	0	0	0.0	0	0
5 - 10	0.2	8	84	-11,877	12	565	101.3	0	0	0.0	0	0
10 - 15	0.4	7	73	-17,816	14	642	151.9	0	0	0.0	0	0
15 - 20	0.5	5	57	-23,755	14	636	202.6	42	1,530	0.0	0	0
20 - 25	0.6	2	16	-29,693	19	883	253.2	0	0	0.0	0	0
25 - 30	0.7	7	70	-35,632	15	698	303.9	0	0	0.0	0	0
30 - 35	0.9	17	180	-41,571	14	648	354.5	0	0	0.0	0	0
35 - ,40	1.0	11	115	-47,509	4	181	405.1	0	0	0.0	0	0
40 - ¹ 45	1.1	11	120	-53,448	0	0	455.8	0	0	0.0	0	0
4550	1.2	5	56	-59,387	0	0	506.4	21	765	0.0	0	0
50 - 55	1.3	11	121	-65,325	0	0	557.1	0	0	0.0	0	0
55 - 60	1.5	2	20	-71,264	0	0	607.7	0	0	0.0	0	0
60 - 65	1.6	2	20	-77,203	0	0	658.4	0	0	0.0	0	0
65 - 70	1.7	0	0	-83,141	0	0	709.0	0	0	0.0	0	0
70 - 75	1.8	0	0	-89,080	0	0	759.7	0	0	0.0	0	0
75 - 80	1.9	2	20	-95,019	0	0	810.3	0	0	0.0	0	0
80 - 85	2.1	1	11	-100,957	0	0	860.9	0	0	0.0	0	0
85 - 90	2.2	0	0	-106.896	0	0	911.6	0	0	0.0	0	0
90 - 95	2.3	0	0	-112,835	0	0	962.2	0	0	0.0	0	0
95 - 100	2.4	3	31	-118,773	0	0	1,012.9	38	1,377	0.0	0	0
Hours Off	0.0	0	7,704	. 0	0	4,189	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

				BUILDING TEMPERATURE PROFILES	
:					
Temperature				Zone Number	
Range (F)	1	1	2		;
Max. Temp.	80.7	105.3	106.5		
Mo./Hr.			8 21		
Day Type	1				
				Number of Hours	
Above 100	0	1,268	1,256		
95 - 100			1,128		
90 - 95	0				
85 - 90	0	276	497		
80 - <b>8</b> 5	0	334	431		
75 - 80	2,903	252	0		
70 - 75	769	119	0		
65 - 70	314	4,969	5,088		
60 - 65	575	0	0		
55 - 60	955	0	0		
50 - 55	374	0	0		
Below 50	2,870	0	0		
Min. Temp.	34.3	67.9	67.9		
Mo./Hr.			1 23		
Day Type	5	1	2		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

------- MONTHLY ENERGY CONSUMPTION--------------

	ELEC	DEMAND	HOT WTR	
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(k₩)	(Therm)	(Tḥrm/hr)
Jan	834	3	249	0
Feb	754	3	251	0
March	855	3	162	0
April	804	3	65	0
May	880	3	0	0
June	1,266	7	0	. 0
July	1,636	7	0	0
Aug	1,254	7	0	0
Sept	838	7	0	0
0ct	844	3	37	0
Nov	804	3	110	0
Dec	824	3	204	0
Total	11,592	7	1,078	0

Building Energy Consumption =

23,411 (Btu/Sq Ft/Year)

Floor Area = 6,296 (Sq Ft)

Source Energy Consumption = 41,690 (Btu/Sq Ft/Year) EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION -----

e f	Equip -					110110	hly Cons							
ШM	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS			<b></b> ,		2.42	201	207	0.5.4		0.47	007	007	0.057
	ELEC PK	833 3.1	753 3.1	854 3.1	803 3.1	843 3.1	824 3.1	823 3.1	854 3.1	803 3.1	843 3.1	803 3.1	823 3.1	9,857 3.1
	rn	J.1	J.1	5.1	J.1	J.1	0.1	0.1	5.1	0,1	0.1	V.1	0.1	0.1
1	MISC LD						_		•					
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0.0	0 0.0	0.0
	<b>γ</b> Λ	<b>V.</b> 0	0.0	0.0	0.0	0.0	0.0	V.0	0.0	0.0	0.0	۷.۷	0.0	٧.٧
2	MISC LD									•		•	•	
	GAS	0	0	0	0	0	0.0	0 0.0	0.0	0.0	0 0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	•
3	MISC LD												_	
	OIL	0	0	0	0	0	0	0	0	0	0 0.0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													_
	P STEAM	0	0	0	0.0	0	0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	NISC LD				•									_
	P CHILL	0	0	0	0.	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-	CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	0	287	573	262	0	0	0	0	1,123
	PK	0.0	0.0	0.0	0.0	0.0	3.3	3.4	3.3	3.1	0.0	0.0	0.0	3.4
1	EQ5200			ENSER FAI	18									
	ELEC	0	0	0	0	0	30	58	27	0	0	0	0	115
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.3
1	EQ5303		CONTI	ROLS										
	ELEC	0	0	0	0	0	90	146	74	0	0	0	0	310
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC CI	ENTRIF. 8	AN C.V.									
	ELEC	0	0	0	0	36	35	36	36	35	0	0	0	179
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	. 0.1
i	EQ2102		PURCI	HASED DIS	ST. HOT I	WATER								•
	P HOTH20	249	251	162	65	0	0	0	0	0	37	110	204	1,078
	ЯK	0.5	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.5
				WATER C										

Trane Air Conditioning Economics V 600 By: Trane Customer Direct Service Network PAGE 47 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS ELEC 0 0 0 0 0 1 1 1 1 1 1 8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

PΚ

0.0

0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 COMBINED ECOS

## ------UTILITY PEAK CHECKSUMS-----

BESTELL		COTOTO	OFMANO
Utility	E L	こししれまし	DEMAND

Peak Value 7.2 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utilit Deman Equipment Description (kW	
cooling t	Equipment		
1	EQ1161	AIR-CLD COND COMP <15 TONS 4.	55.13
Sub Total	1	4.	55.13
Sub Total	l	0.	0.00
Air Movin	ng Equipment		
1		SUMMATION OF FAN ELECTRICAL DEMAND 0.	1.20
Sub Total	l	0.	1.20
Sub Total	l	0	0.00
Miscellar	neous		
Lights Base Uti Misc Equ		3. 0. 0.	0.00
Sub Total		3.	
Grand Tot	tal	7.:	100.00

Building 313

Trace Input File

## CONTENTS OF : C:\JOBS\CB313.TM LINE # 1 J08 - 1 2 01/ENERGY SAVINGS OPPORTUNITY STUDY 01/CARLISLE BARRACKS, PA 4 01/DEPARTMENT OF THE ARMY 5 01/BENATEC ASSOCIATES 01/BUILDING 313 08/CARLISLE 09/MAY/SEP////APR/OCT 10/CLTD-CLF 11///ZONE 10 11 LOAD - 1 19/1/BASE BUILDING 12 20/1/1/LIQUOR STORE/1073/1/2/0//10 20/2/2/RAD ONLY/2856/1/2/0//12 14 15 20/3/3/ATTIC/1354/1/1/0//10 16 20/4/4/OFFICES/1266/1/1/0//10 17 20/5/5/PARTY ROOMS/1748/1/1//15 18 20/6/6/LOUNGE/1564/1/1/1//12 19 20/7/7/MECH ROOM/469/1/2/0//10 20 20/8/8/LOBBY/1071/1/1/1/12 21 20/9/9/PRIVATE DINING/544/1/2/0//12 20/10/10/DINING ROOM/1537/1/1/1//12 22 23 20/11/11/BALL ROOM/4223/1/1/2//20 20/12/12/KITCHEN/1966/1/2/0//12 24 20/13/13/KITCHEN OFFICE/51/1/2/0//12 21/1/38/45/38//35/35//ROOM 26 27 21/2///CBOMTX///CBOMTX 28 21/3///CBOMTX///CBOMTX 29 21/4///CBOMTX///CBOMTX 21/5///CBOMTX///CBOMTX 30 31 21/6////CBOMTX///CBOMTX 21/8///CBOMTX///CBOMTX 32 33 21/9///CBOMTX///CBOMTX 21/10////CBOMTX///CBOMTX 34 35 21/11///CBOMTX///CBOMTX 36 21/12////CBOMTX///CBOMTX 37 21/13////CBOMTX///CBOMTX 38 22/2/1/NO/2015/1//119 39 22/2/2/NO/138/1//171 · 40 ~ 22/3/1/YES////171 41 22/4/1/YES////171 42 22/9/1/YES////119 43 22/12/1/YES////119 44 22/13/1/YES////119 45 24/2/1/21/11//127/30 46 24/2/2/39/11//127/120 47 24/2/3/46/11//127/210 24/2/4/117/11//127/300 48 49 24/3/1/94/9//128/30 50 24/3/2/29/9//128/120 51 24/3/3/31/9//128/210 52 24/4/1/43/9//170/120

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24/4/3/21/9//128/120

24/4/4/52/9//128/210

24/5/1/14/14//127/210

24/5/2/16/14//127/300

24/6/1/31/11//170/30

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      24/6/2/21/11//170/120
      24/6/3/53/11//170/210
  60
  61
      24/8/1/51/11//170/120
  62
      24/9/1/16/11//127/30
  63
      24/9/2/34/11//127/120
  64
      24/10/1/29/11//170/120
 65
      24/10/2/31/11//170/210
      24/12/1/45/11//127/30
 66
 67
      25/2/2/4.75/3/1/.55/.57
 68
      25/2/4/72.8/1/4/.55/.57
 69
      25/3/1/2.2/1.6/3/.55/.57
 70
      25/3/2/2.2/1.6/1/.55/.57
 71
      25/4/1/4.75/3/4/.55/.57
 72
      25/4/3/2.2/1.6/1/.55/.57
 73
      25/4/4/2.2/1.6/3/.55/.57
 74
      25/5/1/80/1/1/.55/.57
 75
      25/5/2/72.8/1/1/.55/.57
 76
      25/6/2/6.5/2.5/3/.55/.57
 77
      25/6/3/6.5/2.5/6/.55/.57
 78
      25/8/1/6.25/3/4/.55/.57
 79
      25/9/1/6.5/2.5/3/.55/.57
 80
      25/9/2/5.25/2.25/2/.55/.57
 81
      25/10/1/6.5/2.5/3/.55/.57
 82
      25/10/2/6.5/2.5/4/.55/.57
 83
      26/1/OFF/OFF/OFF/OFF/OFF/AVAIL/OFF/OFF/OFF
 84
      26/2/OFF/OFF/OFF/AVAIL/OFF/OFF/OFF/OFF/CBOMFAN/OFF
 85
      26/3/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 86
      26/4/CBOMP/CBOHL/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF
 87
      26/5/CBOMP/CBOML/CBOMCLG/AVAIL/OFF/CBOMCLG/OFF/OFF/OFF/OFF
 88
      26/6/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 89
      26/7/OFF/OFF/CBOMFAN/AVAIL/OFF/OFF/OFF/OFF/CBOMFAN/OFF
      26/8/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBCMFAN/OFF/OFF/OFF
 91
      26/9/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 92
      26/10/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 93
      26/11/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBGMFAN/OFF/OFF/OFF
      26/12/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 94
      26/13/CBOMP/CBOML/OFF/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 95
 96
      27/3/153/SF-PERS/255/325/1.35/WATT-SF
 97
      27/4/153/SF-PERS/255/325/1.35/WATT-SF
      27/5/153/SF-PERS/255/325/1.35/WATT-SF
 98
 99
      27/6/153/SF-PERS/255/325/1.35/WATT-SF
100
      27/8/153/SF-PERS/255/325/1.35/WATT-SF
101
      27/9/153/SF-PERS/255/325/1.35/WATT-SF
102
      27/10/153/SF-PERS/255/325/1.35/WATT-SF
103
      27/11/153/SF-PERS/255/325/1.35/WATT-SF
      27/12/153/SF-PERS/255/325/1.35/WATT-SF
104
105
      27/13/153/SF-PERS/255/325/1.35/WATT-SF
      28/12/1/COOKING/48000/BTUH/CBOMFAN/ELEC/90//80
106
107
      29/1////.44/CFM-SF
108
      29/2/////.44/CFM-SF
109
      29/3/450/CFM/450/CFM/.44/CFM-SF/.44/CFM-SF
110
      29/4/235/CFM/235/CFM/.44/CFM-SF/.44/CFM-SF
111
      29/5/1950/CFM///.44/CFM-SF/.44/CFM-SF
112
      29/6/1600/CFM/1600/CFM/.44/CFM-SF/.44/CFM-SF
113
      29/7/5220/CFM/5220/CFM/.44/CFM-SF/.44/CFM-SF
114
      29/8/110/CFM///.44/CFM-SF/.44/CFM-SF
115
      29/9/360/CFM/360/CFM/.44/CFM-SF/.44/CFM-SF
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29/10/780/CFM/780/CFM/.44/CFM-SF/.44/CFM-SF

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
117
       29/11/5040/CFM/5040/CFM/.44/CFM-SF/.44/CFM-SF
 118
       29/12/14400/CFM/14400/CFM///.44/CFM-SF
 119
      29/13////.44/CFM-SF
120
       30/1
       30/2///////2945/CFM
 121
 122
       30/3/1600/CFM/1600/CFM////200/CFM
 123
       30/4/2325/CFM/2325/CFM
 124
       30/5/3225/CFM
      30/6/3315/CFM/3315/CFM////1000/CFM
 125
 126
       30/7//////5220/CFM
 127
       30/8/1100/CFM
       30/9/1000/CFM/1000/CFM
 128
       30/10/2400/CFM/2400/CFM
 129
130
      30/11/11100/CFM/11100/CFM
      30/12/18000/CFM/18000/CFM////15150/CFM
131
132
       30/13/200/CFM
133
      31/2/1/114/3//147/SINE-FIT/80/50
 134
      31/7/1/36/3//147/SINE-FIT/80/50
135
      SYSTEM - 1
      39/1/BASE BUILDING
 136
137
       40/1/PTAC
138
       41/1/1/1
139
      42/1/.2
 140
       44/1
141
      45/1/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF/OFF
142
      40/2/RAD
       41/2/2/2
143
144
       42/2///.125//.125
 145
 146
      45/2/OFF/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
147
      40/3/SZ
      41/3/3/3
148
149
      42/3/1.75///.125//.125
 150
151
       45/3/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
152
      40/4/SZ
153
      41/4/4/4
154
      42/4/1.75
155
      44/4
      45/4/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
156
      40/5/VAV
157
      41/5/5/5
158
159
      42/5/2
      44/5
160
      45/5/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
161
      40/6/SZ
162
      41/6/6/6
163
      42/6/1.75///.19//.19
164
165
      45/6/CBOMCLG/OFF/OFF/OFF/CFF/CBOMHTG/OFF/CBOMCLG/OFF/OFF
166
167
      40/7/SZ
      41/7/7/7
168
169
      42/7////.75//.75
170
      44/7
      45/7/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
171
172
      40/8/SZ
      41/8/8/8
173
174
      42/8/1.75
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CONTENTS OF : C:\JOBS\CB313.TM
LINE # -----
 175
       44/8
 176
       45/8/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 177
       40/9/SZ
 178
       41/9/9/9
 179
       42/9/.2
 180
       44/9
 181
       45/9/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 182
       40/10/SZ
 183
      41/10/10/10
       42/10/.4
 184
185
       44/10
 186
       45/10/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
187
       40/11/SZ
188
       41/11/11/11
189
     42/11/2
 190
      44/11
191
      45/11/CBOMCLG/CFF/OFF/OFF/OFF/CBOMHTG/CBOMCLG/OFF/OFF
      40/12/SZ
192
193
       41/12/12/12
194
      42/12/2.75///.25//.25
195
       44/12/NONE//////60//HEAT
196
      45/12/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
197
      40/13/FC
198
      41/13/13/13
199
      42/13/.2
200
      44/13
201
      45/13/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
202
      40/14/RAD
203
      41/14/3/6/8/10
204
      42/14
205
      45/14/OFF/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
206
      EQUIPMENT - 1
207
      59/1/CARLISLE///BASE BUILDING
208
      60/1/1/PKPLANT/1/1
209
      .60/2/2/BLKPLANT/3/6/8/8/13/13
210
      60/3/3/PKPLANT/9/9
211
      60/4/4/PKPLANT/10/10
      60/5/5/8LKPLANT/11/11
212
213
      62/1/EQ1161/1
214
      62/2/EQ1100S/1/39.4/TONS
215
      62/3/E01281/1
      62/4/EQ1281/1
216
217
      62/5/EQ1101L/1/52.7/TONS
218
      63/2/3/HP
219
      63/5/3/HP
220
      65/1/1//2/6/11/11/14/14
221
      65/2/2//9/10
      65/3/3//12/12
222
      67/1/EQ2102/1/35/FT-WATER
223
224
      67/2/EQ2261/2
225
      67/3/EQ2101/1
226
      69/1/EQ4003
227
      69/2
228
      69/3/EQ4003//EQ4003//EQ4003
229
      69/4/EQ4003
230
      69/5/EQ4003
231
      69/6/EQ4003//EQ4003//EQ4003
232
      69/7
```

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
 233
       69/8/EQ4003
 234
       69/9/EQ4003
 235
       69/10/EQ4003
 236
       69/11/EQ4003
 237
       69/12/EQ4003////EQ4003
 238
       69/13/EQ4003
 239
       LOAD - 2
       19/2/WALL & ROOF INSULATION
 240
 241
       20/1/1/LIQUOR STORE/1073/1/2/0//10
 242
       20/2/2/RAD ONLY/2856/1/2/0//12
 243
       20/3/3/ATTIC/1354/1/1/0//10
 244
       20/4/4/OFFICES/1266/1/1/0//10
       20/5/5/PARTY ROOMS/1748/1/1/1//15
 245
 246
       20/6/6/LOUNGE/1564/1/1/1//12
       20/7/7/MECH ROOM/469/1/2/0//10
 247
 248
       20/8/8/LOBBY/1071/1/1/1/12
       20/9/9/PRIVATE DINING/544/1/2/0//12
 249
       20/10/10/DINING ROOM/1537/1/1/1//12
 250
       20/11/11/8ALL ROOM/4223/1/1/2//20
 251
       20/12/12/KITCHEN/1966/1/2/0//12
 252
       20/13/13/KITCHEN OFFICE/51/1/2/0//12
 253
 254
       21/1/38/45/38//38/38
 255
       21/2///CBOMTX///CBOMTX
       21/3///CBOMTX///CBOMTX
 256
 257
       21/4///CBOMTX///CBOMTX
 258
       21/5////CBOMTX///CBCMTX
       21/6///CBOMTX///CBOMTX
 259
 260
       21/8///CBOMTX///CBOMTX
 261
       21/9////CBOMTX///CBOMTX
       21/10////CBOMTX///CBOMTX
 262
       21/11////CBOMTX///CBCMTX
 263
       21/12////CBOMTX///CBOMTX
 264
 265
       21/13////CBOMTX///OBEMTX
       22/2/1/NO/2015/1//119
 266
       22/2/2/NO/138/1//171
 267
 268
       22/3/1/YES////171
       22/4/1/YES////171
 269
 270
       22/9/1/YES////119
 271
       22/12/1/YES////119
 272
       22/13/1/YES////119
 273
       24/2/1/21/11//127/30
       24/2/2/39/11//127/120
 274
 275
       24/2/3/46/11//127/210
 276
       24/2/4/117/11//127/300
       24/3/1/94/9//117/30
 277
 278
       24/3/2/29/9//117/120
 279
       24/3/3/31/9//117/210
 280
       24/4/1/43/9//183/120
       24/4/2/30/9//117/30
 281
 282
       24/4/3/21/9//117/120
       24/4/4/52/9//117/210
 283
 284
       24/5/1/14/14//127/210
 285
       24/5/2/16/14//127/300
 286
       24/6/1/31/11//183/30
       24/6/2/21/11//183/120
 287
       24/6/3/53/11//183/210
 288
```

290

24/8/1/51/11//183/120

24/9/1/16/11//127/30

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
 291
       24/9/2/34/11//127/120
 292
       24/10/1/29/11//183/120
 293
       24/10/2/31/11//183/210
 294
       24/12/1/45/11//127/30
 295
       25/2/2/4.75/3/1/.55/.57
 296
       25/2/4/72.8/1/4/.55/.57
 297
       25/3/1/2.2/1.6/3/.55/.57
 298
       25/3/2/2.2/1.6/1/.55/.57
 299
       25/4/1/4.75/3/4/.55/.57
 300
       25/4/3/2.2/1.6/1/.55/.57
 301
       25/4/4/2.2/1.6/3/.55/.57
302
       25/5/1/80/1/1/.55/.57
 303
       25/5/2/72.8/1/1/.55/.57
304
      25/6/2/6.5/2.5/3/.55/.57
305
       25/6/3/6.5/2.5/6/.55/.57
      25/8/1/6.25/3/4/.55/.57
306
307
       25/9/1/6.5/2.5/3/.55/.57
308
       25/9/2/5.25/2.25/2/.55/.57
309
       25/10/1/6.5/2.5/3/.55/.57
310
       25/10/2/6.5/2.5/4/.55/.57
311
       26/1/OFF/OFF/OFF/AVAIL/OFF/AVAIL/OFF/OFF/OFF/OFF
312
      26/2/OFF/OFF/OFF/AVAIL/OFF/OFF/OFF/OFF/CBOMFAN/OFF
313
      26/3/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
314
      26/4/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
315
       26/5/CBOMP/CBOML/CBOMCLG/AVAIL/OFF/CBOMCLG/OFF/OFF/OFF/OFF
316
      26/6/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
317
      26/7/OFF/OFF/CBOMFAM/AVAIL/OFF/OFF/OFF/OFF/CBOMFAM/OFF
318
      26/8/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
319
      26/9/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/GFF/GFF/GFF/OFF
320
      26/10/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/GFF/OFF/OFF
321
      26/11/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/GFF/GFF/OFF
322
      26/12/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/GFF/CBOMFAN/OFF
323
      26/13/CBOMP/CBOML/OFF/AVAIL/GFF/CBOMFAN/OFF/OFF/OFF/GFF
324
      27/3/153/SF-PERS/255/325/1.35/WATT-SF
325
      27/4/153/SF-PERS/255/325/1.35/WATT-SF
      27/5/153/SF-PERS/255/325/1.35/WATT-SF
326
327
      27/6/153/SF-PERS/255/325/1.35/WATT-SF
328
      27/8/153/SF-PERS/255/325/1.35/WATT-SF
329
      27/9/153/SF-PERS/255/325/1.35/WATT-SF
      27/10/153/SF-PERS/255/325/1.35/WATT-SF
330
      27/11/153/SF-PERS/255/325/1.35/WATT-SF
331
332
      27/12/153/SF-PERS/255/325/1.35/WATT-SF
333
      27/13/153/SF-PERS/255/325/1.35/WATT-SF
334
      28/12/1/COOKING/48000/BTUH/CBOMFAN/ELEC/90//80
335
      29/1////.39/CFM-SF
336
      29/2/////.39/CFM-SF
      29/3/450/CFM/450/CFM/.39/CFM-SF/.39/CFM-SF
337
      29/4/235/CFM/235/CFM/.39/CFM-SF/.39/CFM-SF
338
339
      29/5/1950/CFM///.39/CFM-SF/.39/CFM-SF
      29/6/1600/CFM/1600/CFM/.39/CFM-SF/.39/CFM-SF
340
      29/7/5220/CFM/5220/CFM/.39/CFM-SF/.39/CFM-SF
341
      29/8/110/CFM///.39/CFM-SF/.39/CFM-SF
342
343
      29/9/360/CFM/360/CFM/.39/CFM-SF/.39/CFM-SF
      29/10/780/CFM/780/CFM/.39/CFM-SF/.39/CFM-SF
344
345
      29/11/5040/CFM/5040/CFM/.39/CFM-SF/.39/CFM-SF
      29/12/14400/CFM/14400/CFM///.39/CFM-SF
346
      29/13////.39/CFM-SF
347
348
      30/1
```

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
 349
       30/2///////2945/CFM
       30/3/1600/CFM/1600/CFM////200/CFM
 350
 351
       30/4/2325/CFM/2325/CFM
 352
       30/5/3225/CFM
       30/6/3315/CFM/3315/CFM////1000/CFM
 353
 354
       30/7///////5220/CFM
 355
       30/8/1100/CFM
 356
       30/9/1000/CFM/1000/CFM
       30/10/2400/CFM/2400/CFM
 357
 358
      30/11/11100/CFM/11100/CFM
       30/12/18000/CFM/18000/CFM////15150/CFM
 359
 360
      30/13/200/CFM
       31/2/1/114/3//147/SINE-FIT/80/50
 361
 362
      31/7/1/36/3//147/SINE-FIT/80/50
 363
      SYSTEM - 2
      39/2/WALL & ROOF INSULATION
 364
 365
      40/1/PTAC
 366
      41/1/1/1
 367
       42/1/.2
368
       44/1
       45/1/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 369
370
       40/2/RAD
       41/2/2/2
371
372
      42/2///.125//.125
373
374
      45/2/OFF/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
375
      40/3/SZ
376
      41/3/3/3
377
      42/3/1.75///.125//.125
378
379
      45/3/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHIG/OFF/OFF/OFF/OFF
380
      40/4/SZ
      41/4/4/4
381
      42/4/1.75
382
383
      44/4
384
      45/4/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
385
      40/5/VAV
386
      41/5/5/5
387
      42/5/2
      44/5
388
      45/5/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
389
390
      40/6/SZ
      41/6/6/6
391
      42/6/1.75///.19//.19
392
393
      44/6
      45/6/CBOMCLG/OFF/OFF/OFF/CBOMHTG/OFF/CBOMCLG/OFF/OFF
394
395
      40/7/SZ
396
      41/7/7/7
397
      42/7////.75//.75
398
399
      45/7/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
400
      40/8/SZ
401
      41/8/8/8
402
      42/8/1.75
403
      44/8
      45/8/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
404
405
      40/9/SZ
      41/9/9/9
406
```

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CONTENTS OF : C:\JOBS\CB313.TM
LINE # -----
       42/9/.2
 407
 408
 409
       45/9/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
 410
       40/10/SZ
       41/10/10/10
 411
       42/10/.4
 412
 413
       44/10
       45/10/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
 414
 415
       40/11/SZ
416
       41/11/11/11
417
       42/11/2
 418
       44/11
 419
       45/11/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/CBOMCLG/OFF/OFF
 420
       40/12/SZ
 421 3 41/12/12/12
422
      42/12/2.75///.25//.25
 423
       44/12/NONE//////60//HEAT
424
       45/12/OFF/OFF/OFF/OFF/CFF/CBOMHTG/OFF/OFF/OFF/OFF
 425
       40/13/FC
       41/13/13/13
 426
427
       42/13/.2
 428
       44/13
 429
       45/13/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 430
      40/14/RAD
       41/14/3/6/8/10
 431
 432
       42/14
 433
       45/14/OFF/OFF/OFF/OFF/CEF/CBOMMTG/OFF/OFF/OFF/OFF
 434
       EQUIPMENT - 2
 435
       59/2/CARLISLE///WALL & ROOF INSULATION
      60/1/1/PKPLANT/1/1
 436
       60/2/2/BLKPLANT/3/6/8/8/13/13
 437
 438
      60/3/3/PKPLANT/9/9
 439
      60/4/4/PKPLANT/10/10
      60/5/5/BLKPLANT/11/11
 440
 441
      62/1/EQ1161/1
      62/2/EQ1100S/1/39.4/TONS
 442
 443
      62/3/E01281/1
 444
      62/4/EQ1281/1
      62/5/E01101L/1/52.7/TONS
 445
 446
      63/2/3/HP
 447
      63/5/3/HP
      65/1/1//2/6/11/11/14/14
448
      65/2/2//9/10
 449
450
      65/3/3//12/12
      67/1/EQ2102/1/35/FT-WATER
 451
 452
      67/2/EQ2261/2
453
      67/3/EQ2101/1
454
      69/1/EQ4003
 455
      69/2
      69/3/EQ4003///EQ4003//EQ4003
 456
 457
      69/4/EQ4003
 458
      69/5/EQ4003
 459
      69/6/EQ4003//EQ4003//EQ4003
 460
      69/7
      69/8/EQ4003
 461
      69/9/EQ4003
 462
 463
      69/10/EQ4003
 464
      69/11/EQ4003
```

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
       69/12/EQ4003////EQ4003
465
466
       69/13/EQ4003
 467
      LOAD - 3
       19/3/WEATHERSTRIP & CAULKING
 468
469
       20/1/1/LIQUOR STORE/1073/1/2/0//10
 470
       20/2/2/RAD ONLY/2856/1/2/0//12
471
       20/3/3/ATTIC/1354/1/1/0//10
       20/4/4/OFFICES/1266/1/1/0//10
472
473
       20/5/5/PARTY ROOMS/1748/1/1//15
 474
       20/6/6/LOUNGE/1564/1/1/1//12
475
       20/7/7/MECH ROOM/469/1/2/0//10
 476
       20/8/8/LOBBY/1071/1/1/1//12
       20/9/9/PRIVATE DINING/544/1/2/0//12
 477
       20/10/10/DINING ROOM/1537/1/1/1/12
 478
      20/11/11/8ALL ROOM/4223/1/1/2//20
479
 480
       20/12/12/KITCHEN/1966/1/2/0//12
 481
       20/13/13/KITCHEN OFFICE/51/1/2/0//12
 482
       21/1/38/45/38//38/38
       21/2////CBOMTX///CBOMTX
 483
       21/3///CBOMTX///CBOMTX
 484
 485
       21/4///CBGMTX///CBGMTX
 486
       21/5////CBOMTX///CBOMTX
 487
       21/6////CBOMTX///CBOMTX
 488
       21/8///CBOMTX///CBOMTX
       21/9////CBOMTX///CBOMTX
 489
 490
       21/10///CBOMTX///CBOMTX
 491
       21/11////CBCMTX///CBGMTX
 492
       21/12////CBOMTX///CBOMTX
 493
       21/13///CBGMTX///CBCMTX
 494
       22/2/1/NO/2015/1//119
       22/2/2/NO/138/1//171
 495
 496
       22/3/1/YES////171
 497
       22/4/1/YES////171
 498
       22/9/1/YES////119
 499
       22/12/1/YES////119
 500
       22/13/1/YES////119
 501
       24/2/1/21/11//127/30
 502
       24/2/2/39/11//127/120
       24/2/3/46/11//127/210
 503
       24/2/4/117/11//127/300
 504
       24/3/1/94/9//128/30
 505
 506
       24/3/2/29/9//128/120
       24/3/3/31/9//128/210
 507
       24/4/1/43/9//170/120
 508
       24/4/2/30/9//128/30
 509
       24/4/3/21/9//128/120
 510
       24/4/4/52/9//128/210
 511
       24/5/1/14/14//127/210
 512
 513
       24/5/2/16/14//127/300
       24/6/1/31/11//170/30
 514
       24/6/2/21/11//170/120
 515
 516
       24/6/3/53/11//170/210
 517
       24/8/1/51/11//170/120
 518
       24/9/1/16/11//127/30
 519
       24/9/2/34/11//127/120
 520
       24/10/1/29/11//170/120
 521
       24/10/2/31/11//170/210
```

24/12/1/45/11//127/30

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
523
       25/2/2/4.75/3/1/.55/.57
 524
       25/2/4/72.8/1/4/.55/.57
 525
       25/3/1/2.2/1.6/3/.55/.57
 526
       25/3/2/2.2/1.6/1/.55/.57
 527
       25/4/1/4.75/3/4/.55/.57
 528
       25/4/3/2.2/1.6/1/.55/.57
 529
       25/4/4/2.2/1.6/3/.55/.57
 530
       25/5/1/80/1/1/.55/.57
 531
       25/5/2/72.8/1/1/.55/.57
 532
       25/6/2/6.5/2.5/3/.55/.57
533
       25/6/3/6.5/2.5/6/.55/.57
 534
       25/8/1/6.25/3/4/.55/.57
 535
       25/9/1/6.5/2.5/3/.55/.57
 536
       25/9/2/5.25/2.25/2/.55/.57
      25/10/1/6.5/2.5/3/.55/.57
537
 538
       25/10/2/6.5/2.5/4/.55/.57
       26/1/OFF/OFF/OFF/AVAIL/OFF/AVAIL/OFF/OFF/OFF
 539
       26/2/OFF/OFF/OFF/AVAIL/GEF/OFF/OFF/OFF/CBCMFAN/OFF
 540
       26/3/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 541
       26/4/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 542
       26/5/CBOMP/CBOML/CBOMCLG/AVAIL/OFF/CBOMCLG/OFF/OFF/OFF/OFF
 543
       26/6/CBOMP/CBOML/CBCMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 544
 545
       26/7/OFF/OFF/CBOMFAN/AVAIL/OFF/OFF/OFF/CBOMFAN/OFF
       26/8/CBOMP/CBOML/CBOMFAM/AVAIL/OFF/CBOMFAM/OFF/OFF/OFF/OFF
 546
       26/9/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 547
 548
       26/10/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
549
       26/11/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAH/OFF/OFF/OFF/OFF
 550
       26/12/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAH/OFF
 551
       26/13/CBOMP/CBOML/OFF/AVAIL/OFF/CBOMPAN/OFF/OFF/OFF/OFF
 552
       27/3/153/SF-PERS/255/325/1.35/WATT-SF
 553
       27/4/153/SF-PERS/255/325/1.35/WATT-SF
 554
       27/5/153/SF-PERS/255/325/1.35/WATT-SF
 555
       27/6/153/SF-PERS/255/325/1.35/WATT-SF
556
       27/8/153/SF-PERS/255/325/1.35/WATT-SF
557
      27/9/153/SF-PERS/255/325/1.35/WATT-SF
 558
       27/10/153/SF-PERS/255/325/1.35/WATT-SF
 559
       27/11/153/SF-PERS/255/325/1.35/WATT-SF
 560
       27/12/153/SF-PERS/255/325/1.35/WATT-SF
       27/13/153/SF-PERS/255/325/1.35/WATT-SF
 561
 562
       28/12/1/COOKING/48000/BTUH/CBOMFAN/ELEC/90//80
 563
      29/1////.42/CFM-SF
       29/2//////.42/CFM-SF
 564
       29/3/450/CFM/450/CFM/.42/CFM-SF/.42/CFM-SF
565
 566
       29/4/235/CFM/235/CFM/.42/CFM-SF/.42/CFM-SF
       29/5/1950/CFM///.42/CFM-SF/.42/CFM-SF
567
 568
       29/6/1600/CFM/1600/CFM/.42/CFM-SF/.42/CFM-SF
      29/7/5220/CFM/5220/CFM/.42/CFM-SF/.42/CFM-SF
569
 570
       29/8/110/CFM///.42/CFM-SF/.42/CFM-SF
       29/9/360/CFM/360/CFM/.42/CFM-SF/.42/CFM-SF
 571
572
       29/10/780/CFM/780/CFM/.42/CFM-SF/.42/CFM-SF
       29/11/5040/CFM/5040/CFM/.42/CFM-SF/.42/CFM-SF
573
       29/12/14400/CFM/14400/CFM///.42/CFM-SF
 574
 575
       29/13////.42/CFM-SF
 576
       30/1
 577
       30/2///////2945/CFM
 578
       30/3/1600/CFM/1600/CFM/////200/CFM
 579
       30/4/2325/CFM/2325/CFM
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30/5/3225/CFM

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CONTENTS OF : C:\JOBS\CB313.TM
LINE #
      30/6/3315/CFM/3315/CFM////1000/CFM
581
 582
      30/7///////5220/CFM
 583
      30/8/1100/CFM
 584
      30/9/1000/CFM/1000/CFM
      30/10/2400/CFM/2400/CFM
 585
      30/11/11100/CFM/11100/CFM
 586
      30/12/18000/CFM/18000/CFM////15150/CFM
 587
      30/13/200/CFM
 588
 589
      31/2/1/114/3//147/SINE-FIT/80/50
      31/7/1/36/3//147/SINE-FIT/80/50
 590
 591
      SYSTEM - 3
      39/3/WEATHERSTRIP & CAULKING
 592
 593
      40/1/PTAC
      41/1/1/1
 594
      42/1/.2
 595
 596
      44/1
 597
      45/1/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 598
      40/2/RAD
       41/2/2/2
 599
       42/2///.125//.125
 600
 601
       45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 602
 603
       40/3/SI
 604
       41/3/3/3
      42/3/1.75///.125//.125
 605
 606
       45/3/CBOMCLG/OFF/OFF/OFF/OFF/CBOMRTG/OFF/OFF/OFF/OFF
 607
 608
      40/4/SZ
 609
       41/4/4/4
 610
      42/4/1.75
 611
       44/4
       45/4/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 612
      40/5/VAV
 613
 614
       41/5/5/5
615
      42/5/2
 616
      44/5
      45/5/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 617
618
      40/6/SZ
      41/6/6/6
 619
      42/6/1.75///.19//.19
 620
 621
      45/6/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/CBOMCLG/OFF/OFF
 622
623
      40/7/SZ
 624
      41/7/7/7
      42/7////.75//.75
 625
626
 627
      45/7/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 628
      40/8/SZ
 629
      41/8/8/8
630
      42/8/1.75
 631
      44/8
      45/8/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 632
 633
      40/9/SZ
 634
      41/9/9/9
 635
      42/9/.2
 636
      44/9
       45/9/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 637
 638
       40/10/SZ
```

```
CONTENTS OF : C:\JOBS\CB313.TM
LINE #
 639
       41/10/10/10
 640
       42/10/.4
 641
       44/10
 642
       45/10/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 643
       40/11/SZ
 644
       41/11/11/11
645
       42/11/2
 646
       44/11
 647
       45/11/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/CBOMCLG/OFF/OFF
648
       40/12/SZ
       41/12/12/12
649
650
       42/12/2.75///.25//.25
651
       44/12/NONE//////60//HEAT
       45/12/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
652
653
       40/13/FC
       41/13/13/13
654
655
       42/13/.2
656
      44/13
       45/13/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
657
      40/14/RAD
658
      41/14/3/6/8/10
659
      42/14
660
      45/14/OFF/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
661
      EQUIPMENT - 3
662
663
      59/3/CARLISLE///WEATHERSTRIP & CAULKING
      60/1/1/PKPLANT/1/1
664
665
      60/2/2/BLKPLANT/3/6/8/8/13/13
      60/3/3/PKPLANT/9/9
666
      60/4/4/PKPLANT/10/10
667
      60/5/5/BLKPLANT/11/11
668
669
      62/1/EQ1161/1
670
      62/2/EQ1100S/1/39.4/TONS
671
      62/3/EQ1281/1
672
      62/4/EQ1281/1
      62/5/EQ1101L/1/52.7/TONS
674
      63/2/3/HP
675
      .63/5/3/HP
676
      65/1/1//2/6/11/11/14/14
677
      65/2/2//9/10
      65/3/3//12/12
678
679
      67/1/EQ2102/1/35/FT-WATER
680
      67/2/EQ2261/2
      67/3/EQ2101/1
681
682
      69/1/EQ4003
      69/2
683
684
      69/3/EQ4003//EQ4003//EQ4003
      69/4/EQ4003
685
      69/5/EQ4003
686
      69/6/EQ4003///EQ4003//EQ4003
687
688
      69/7
689
      69/8/EQ4003
690
      69/9/EQ4003
691
      69/10/EQ4003
692
      69/11/EQ4003
      69/12/EQ4003////EQ4003
693
694
      69/13/EQ4003
695
      LOAD - 4
696
      19/4/COMBINED ECOS
```

```
CONTENTS OF : C:\JOBS\CB313.TM
LINE #
697
       20/1/1/LIQUOR STORE/1073/1/2/0//10
 698
       20/2/2/RAD ONLY/2856/1/2/0//12
 699
       20/3/3/ATTIC/1354/1/1/0//10
 700
       20/4/4/OFFICES/1266/1/1/0//10
 701
       20/5/5/PARTY ROOMS/1748/1/1/1/15
 702
       20/6/6/LOUNGE/1564/1/1/1//12
 703
       20/7/7/MECH ROOM/469/1/2/0//10
 704
       20/8/8/L088Y/1071/1/1/1//12
 705
       20/9/9/PRIVATE DINING/544/1/2/0//12
       20/10/10/DINING ROOM/1537/1/1/1/12
 706
 707
       20/11/11/BALL ROOM/4223/1/1/2//20
708
       20/12/12/KITCHEN/1965/1/2/0//12
 709
       20/13/13/KITCHEN OFFICE/51/1/2/0//12
 710
       21/1/38/45/38//38/38
 711
       21/2////CBOMTX///CBOMTX
       21/3///CBOMTX///CBOMTX
 712
 713
       21/4///CBOMTX///CBOMTX
 714
       21/5////CBOMTX///CBOMTX
715
       21/6////CBGMTX///CBGMTX
 716
       21/8///CBOMTX///CBOMTX
 717
       21/9///CBOMTX///CBOMTX
 718
       21/10////CBOMTX///CBOMTX
719
       21/11////CBCMTX///CBCMTX
720
       21/12////CBGMTX///GBGMTX
721
       21/13////CBOMTX///CBOMTX
722
       22/2/1/NO/2015/1//119
723
       22/2/2/NO/138/1//171
 724
       22/3/1/YES////171
725
       22/4/1/YES////171
 726
       22/9/1/YES////119
727
       22/12/1/YES////119
728
       22/13/1/YES////119
       24/2/1/21/11//127/30
729
730
       24/2/2/39/11//127/120
731
      24/2/3/46/11//127/210
732
       24/2/4/117/11//127/300
733
      24/3/1/94/9//117/30
734
      24/3/2/29/9//117/120
735
      24/3/3/31/9//117/210
      24/4/1/43/9//183/120
736
737
      24/4/2/30/9//117/30
      24/4/3/21/9//117/120
738
739
      24/4/4/52/9//117/210
      24/5/1/14/14//127/210
740
741
      24/5/2/16/14//127/300
742
      24/6/1/31/11//183/30
743
      24/6/2/21/11//183/120
744
      24/6/3/53/11//183/210
745
      24/8/1/51/11//183/120
746
      24/9/1/16/11//127/30
747
      24/9/2/34/11//127/120
748
      24/10/1/29/11//183/120
749
      24/10/2/31/11//183/210
750
      24/12/1/45/11//127/30
751
      25/2/2/4.75/3/1/.55/.57
752
      25/2/4/72.8/1/4/.55/.57
753
      25/3/1/2.2/1.6/3/.55/.57
```

25/3/2/2.2/1.6/1/.55/.57

```
CONTENTS OF : C:\JOBS\CB313.TM
LINE #
 755
       25/4/1/4.75/3/4/.55/.57
 756
       25/4/3/2.2/1.6/1/.55/.57
 757
       25/4/4/2.2/1.6/3/.55/.57
 758
       25/5/1/80/1/1/.55/.57
 759
       25/5/2/72.8/1/1/.55/.57
 760
       25/6/2/6.5/2.5/3/.55/.57
 761
       25/6/3/6.5/2.5/6/.55/.57
 762
       25/8/1/6.25/3/4/.55/.57
 763
       25/9/1/6.5/2.5/3/.55/.57
 764
       25/9/2/5.25/2.25/2/.55/.57
       25/10/1/6.5/2.5/3/.55/.57
 765
       25/10/2/6.5/2.5/4/.55/.57
 766
 767
       26/1/OFF/OFF/OFF/AVAIL/OFF/AVAIL/OFF/OFF/OFF/OFF
       26/2/OFF/OFF/OFF/AVAIL/CFF/OFF/OFF/OFF/CBOMFAN/OFF
 768
       26/3/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 769
 770
       26/4/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF
 771
       26/5/CBOMP/CBGML/CBGMCLG/AVAIL/OFF/CBGMCLG/OFF/OFF/OFF
 772
       26/6/CBOMP/CBCML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/GFF/CBSMFAN/OFF
       26/7/OFF/OFF/CBGMFAN/AVAIL/OFF/OFF/OFF/OFF/CBGMFAN/OFF
773
 774
       26/8/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 775
       26/9/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
       26/10/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 776
 777
       26/11/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF/OFF
 778
       26/12/CBOMP/CBOML/CBOMFAN/AVAIL/OFF/CBOMFAN/OFF/OFF/CBOMFAN/OFF
 779
       26/13/CBOMP/CBOML/OFF/AVAIL/OFF/CBOMFAN/OFF/OFF/OFF
 780
       27/3/153/SF-PERS/255/325/1.35/WATT-SF
 781
       27/4/153/SF-PERS/255/325/1.35/WATT-SF
       27/5/153/SF-PERS/255/325/1.35/WATT-SF
 782
 783
       27/6/153/SF-PERS/255/325/1.35/WATT-SF
 784
       27/8/153/SF-PERS/255/325/1.35/WATT-SF
       27/9/153/SF-PERS/255/325/1.35/WATT-SF
 785
       27/10/153/SF-PERS/255/325/1.35/WATT-SF
 786
       27/11/153/SF-PERS/255/325/1.35/WATT-SF
 787
       27/12/153/SF-PERS/255/325/1.35/WATT-SF
 788
 789
       27/13/153/SF-PERS/255/325/1.35/WATT-SF
 790
       28/12/1/COOKING/48000/BTUH/CBOMFAN/ELEC/90//80
       29/1////.36/CFM-SF
 791
       29/2/////.36/CFM-SF
792
       29/3/450/CFM/450/CFM/.36/CFM-SF/.36/CFM-SF
 793
       29/4/235/CFM/235/CFM/.36/CFM-SF/.36/CFM-SF
 794
       29/5/1950/CFM///.36/CFM-SF/.36/CFM-SF
 795
 796
       29/6/1600/CFM/1600/CFM/.36/CFM-SF/.36/CFM-SF
       29/7/5220/CFM/5220/CFM/.36/CFM-SF/.36/CFM-SF
 797
       29/8/110/CFM///.36/CFM-SF/.36/CFM-SF
 798
       29/9/360/CFM/360/CFM/.36/CFM-SF/.36/CFM-SF
 799
       29/10/780/CFM/780/CFM/.36/CFM-SF/.36/CFM-SF
 800
       29/11/5040/CFM/5040/CFM/.36/CFM-SF/.36/CFM-SF
801
       29/12/14400/CFM/14400/CFM///.36/CFM-SF
 802
       29/13////.36/CFM-SF
803
       30/1
 804
805
       30/2//////2945/CFM
       30/3/1600/CFM/1600/CFM////200/CFM
 806
 807
       30/4/2325/CFM/2325/CFM
 808
       30/5/3225/CFM
       30/6/3315/CFM/3315/CFM////1000/CFM
 809
       30/7///////5220/CFM
 810
 811
       30/8/1100/CFM
       30/9/1000/CFM/1000/CFM
```

```
CONTENTS OF : C:\JOBS\CB313.TM
LINE # --
       30/10/2400/CFM/2400/CFM
813
 814
       30/11/11100/CFM/11100/CFM
 815
       30/12/18000/CFM/18000/CFM////15150/CFM
       30/13/200/CFM
       31/2/1/114/3//147/SINE-FIT/80/50
 817
 818
       31/7/1/36/3//147/SINE-FIT/80/50
       SYSTEM - 4
819
 820
       39/4/COMBINED ECOS
       40/1/PTAC
 821
822
       41/1/1/1
823
       42/1/.2
       44/1
 824
       45/1/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 825
 826
       40/2/RAD
827
       41/2/2/2
: 828
       42/2///.125//.125
 829
       45/2/OFF/OFF/OFF/OFF/OFF/CBOMHIG/GFF/OFF/OFF/OFF
 830
 831
       40/3/SZ
       41/3/3/3
 832
       42/3/1.75///.125//.125
 833
 834
       44/3
       45/3/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 835
 836
       40/4/SZ
 837
       41/4/4/4
       42/4/1.75
 838
 839
       44/4
       45/4/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 840
 841
       40/5/VAV
 842
       41/5/5/5
843
       42/5/2
 844
       45/5/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
845
846
       40/6/SZ
 847
       41/6/6/6
       42/6/1.75///.19//.19
848
 849
      44/6
       45/6/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/CBOMCLG/OFF/OFF
 850
       40/7/SZ
851
852
       41/7/7/7
      42/7////.75//.75
853
854
       45/7/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 855
856
       40/8/SZ
       41/8/8/8
857
858
      42/8/1.75
859
       44/8
       45/8/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
860
861
       40/9/SZ
       41/9/9/9
862
863
       42/9/.2
 864
       44/9
       45/9/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
 865
 866
       40/10/SZ
       41/10/10/10
 867
868
      42/10/.4
 869
       44/10
       45/10/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
```

```
CONTENTS OF : C:\JOBS\CB313.TM
LINE #
871
       40/11/SZ
 872
       41/11/11/11
 873
       42/11/2
 874
       44/11
       45/11/CBOMCLG/OFF/OFF/OFF/OFF/CBOMHTG/CBOMCLG/OFF/OFF
 875
 876
       40/12/SZ
 877
       41/12/12/12
       42/12/2.75///.25//.25
 878
 879
       44/12/NONE//////60//HEAT
880
       45/12/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF
 881
       40/13/FC
882
       41/13/13/13
883
       42/13/.2
884
       44/13
885
       45/13/CBOMCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
886
       40/14/RAD
887
       41/14/3/6/8/10
888
       42/14
889
       45/14/OFF/OFF/OFF/OFF/OFF/CBOMHTG/OFF/OFF/OFF/OFF
       EQUIPMENT - 4
890
891
       59/4/CARLISLE///COMBINED ECOS
      60/1/1/PKPLANT/1/1
893
       60/2/2/BLKPLANT/3/6/8/8/13/13
894
      60/3/3/PKPLANT/9/9
895
      60/4/4/PKPLANT/10/10
896
      60/5/5/BLXPLANT/11/11
897
       62/1/EQ1161/1
      62/2/EQ1100S/1/39.4/TONS
898
899
      62/3/EQ1281/1
900
      62/4/EQ1281/1
901
      62/5/EQ1101L/1/52.7/TONS
902
      63/2/3/HP
903
      63/5/3/HP
904
      65/1/1//2/6/11/11/14/14
905
      65/2/2//9/10
906
      65/3/3//12/12
      67/1/EQ2102/1/35/FT-WATER
907
908
      67/2/EQ2261/2
909
      67/3/EQ2101/1
910
      69/1/EQ4003
911
      69/2
912
      69/3/EQ4003//EQ4003//EQ4003
913
      69/4/EQ4003
914
      69/5/EQ4003
915
      69/6/EQ4003///EQ4003//EQ4003
916
      69/7
917
      69/8/EQ4003
918
      69/9/EQ4003
919
      69/10/EQ4003
920
      69/11/EQ4003
921
      69/12/EQ4003////EQ4003
```

69/13/EQ4003

Building 313

Trace Output File

```
**************************
**************************
**
          600
                        **
      TRACE
             ANALYSIS
**
**
      by
***************************
```

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES **BUILDING** 313

Weather File Code:	CARLIS	LE
Location:	ENERGY	SAVINGS OPPORTUNITY STUDY
Latitude:	40.2	(deg)
Longitude:		(deg)
Time Zone:	5	
Elevation:	475	(ft)
Barometric Pressure:		(in. Hg)
Summer Clearness Number:	1 00	
	1.00	
Winter Clearness Number:	1.00	(=)
Summer Design Dry Bulb:		(F)
Summer Design Wet Bulb:	72	(F)
Winter Design Dry Bulb:	4	(F)
Summer Ground Relectance:	0.20	
Winter Ground Relectance:	0.20	*
Air Density:	0.0742	(Lbm/cuft)
Air Specific Heat:		(Btu/lbm/F)
Density-Specific Heat Prod:		(Btu-min./hr/cuft/F)
Latent Heat Factor:		(8tu-min./hr/cuft)
Enthalpy Factor:	4.4519	
Design Simulation Period: May	To :	September

System Simulation Period: January To December

CLTD/CLF (Transfer Function Method) Cooling Load Methodology:

Time/Date Program was Run: 2/ 1/94 17:34:11 Dataset Name:

CB313 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

------ S Y S T E M S U M M A R Y ----- S Y S T E M S U M M A R Y ------ (Design Airflow Quantities)

		*		Main			Auxil.	Room		
		Outside	Cooling	Heating	Return	Exhaust	Supply	Exhaust		
System	System	Airflow								
Number	Type	(Cfm)								
1	PTAC	0	0	0	0	0	0	0		
2	RAD	0	0	0	0	1,079	0	0		
3	SZ	450	1,600	1,600	2,210	1,060	0	200		
4	SZ	235	2,325	2,325	2,903	813	0	0		
- 5	VAV	896	896	0	1,081	1,081	0	0		
6	SZ	1,600	3,315	3,315	3,823	2,108	0	1,000		
7	SI	5,220	5,220	5,220	5,220	5,220	0	5,220		
8	SZ	110	1,100	1,100	1,347	357	0	0		
9	SI	360	1,000	1,000	1,242	602	0	. 0		
10	SZ	780	2,400	2,400	2,690	1,070	0	0		
11	SZ	5,040	11,100	11,100	11,100	5,040	0	0		
12	SZ	14,400	18,000	18,000	18,218	14,618	0	15,150		
13	FC	0.	200	200	200	. 0	0	0		
14	RAD	0	0	0	0	2,660	0	0		
Totals		29,091	47,157	46,260	50,035	35,709	0	.21,570		

CAPACITY - ALTERNATIVE 1
BASE BUILDING

(Design Capacity Quantities)

		Main Suc		ling Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Heating Reheat	Humidif	Opt. Vent	Heating
Custon	Custon				Totals	Capacity	Capacity		Capacity	Capacity	•	Totals
System	•						(Btuh)	(Btuh)	(Btuh)	(Btuh)		(Btuh)
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(oran)	(ocur)	(BCGII)	(Bruit)	(btuil)	(ucuit)
1	PTAC	0.0	0.0	0.0	0.0	0	0	0	. 0	0	0	0
	RAD	0.0			0.0	-99,354	0	0	0	0	0	-99,354
	SZ	5.4			5.4	-69,193	0	-9,357	0	0	0	-69,193
	SZ	4.5			4.5	-68,486	0	0	0	0	0	-68,486
	VAV	4.2			4.2	-19,289	0	-47,267	0	0	0	-66,556
	SZ	6.3			6.3	-62,801	0	-105,768	0	0	Ó	-62,801
	SZ	18.8			18.8	-280	0		0	0	0	-280
	SZ	2.1			2.1	-30,557	0	0	0	0	0	-30,557
	SZ	1.7			1.7	-22,333	0	-22,271	. 0	0	0	-22,333
	SZ .	3.5			3.5	-36,313	0		. 0	0	0	-36,313
	SZ	11.0			11.0	-1,208	0	'	0	0	0	-1,208
	SZ	36.5			36.5	-21,334	0	-1,047,061	0	0	0	-21,334
	FC	0.0			0.0	-116	. 0		0	0	0	-116
	RAD	0.0			0.0	-308,782	0	0	0	0	0	-308,782
Totals		94.1	0.0	0.0	94.1	-740,045	0	-2,083,953	. 0	0	0	-787,312
74.1	74.1		0.0	0.0	74.1	-/40,043	U	-2,000,700	. 0	U	V	101,312

The building peaked at hour 14 month 7 with a capacity of 94.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- ENGINEERING CHECKS

. 15 s			Percent		Coo	ling		Heat		
System	Main/	System	Outside	Cfm/	Ofm/	Sq Ft	Btuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	PTAC	0.00	0.00	1,088.5	******	0.00	0.00	0.00	1,073
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-34.79	2,856
3	Main	SI	28.13	1.18	299.0	253.0	47.42	1.18	-51.10	1,354
4	Main	SI	10.11	1.84	512.2	278.9	43.02	1.84	-54.10	1,266
5	Main	VAV	100.00	0.51	213.6	416.5	28.81	0.00	-38.08	1,748
6	Main	SZ	48.27	2.12	523.8	247.1	48.56	2.12	-40.15	1,564
7	Main	SZ	99.99	11.13	278.3	25.0	479.87	11.13	-0.60	469
8	Main	SZ	10.00	1.03	524.2	510.4	23.51	1.03	-28.53	1,071
9	Main	<b>S</b> Z	36.00	1.84	571.6	311.0	38.59	1.84	-41.05	544
10	Main	SI	32.50	1.56	679.7	435.3	27.57	1.56	-23.63	1,537
11	Main	SZ	45.41	2.63	1,012.0	385.0	31.17	2.63	-0.29	4,223
12	Main	SZ	. 80.00	9.16	493.1	53.9	222.81	9.16	-10.85	1,966
13	Main	FC	0.00	3.92	4,658.1	1,187.8	10.10	3.92	-2.28	51
14	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-33.99	9,084

System	1	Peak	PTAC	- PACKAGE	D TERMINAL	AIR CON	D.								
*****	*******	******	OOLING COIL	DFAV ****	*******	******	****	**** CIG	SPACE	PFAK ****	****** HFAT	ING COIL P	FAK :	******	
	t Time ==		Mo/Hr:				*		/Hr: 7			Mo/Hr: 13			
Outside			DB/WB/HR: 9		n		*			1 *	•	OADB:	4		
0015108	H11/	UH	vojnejnk.	71/ /0/ 70.	J		*		, ,	*		011001			
	•	Space	Ret Air	Ret. Air	Net	t Percn	t *	Si	pace	Percnt *	Space Pea	k Coil F	eak	Percnt	
	S	ens.+Lat.	Sensible	Latent	Total			Sens	-	Of Tot *	Space Ser			Of Tot	
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)				tuh)	(%) *	(Btuh		uh)	(\$)	
Skylit		0	0	(00011)			0 *	(0	0	0.00 *	(	0	Ó	0.00	
Skylit		0	0				0 *		0	0.00 *		0	0	0.00	
Roof C		0	0		(		0 *		0	0.00 *		0	0	0.00	
Glass	•	0	0		(		0 *		0	0.00 *		0	0	0.00	
Glass		0	0		(		0 *		0	0.00 *		0	0	0.00	
Wall C		0	0		(		0 *		0	0.00 *		0	0	0.00	
Partit		0			- (	0.0	0 *		0	0.00 *		0	0	0.00	
	d Floor	0			(	0.0	0 *		0	0.00 *		0	0	0.00	
Infilt		0			(	97.4	5 *		0	100.00 *		0	0	104.68	
Sub To		0	0		(	97.4	5 *		0	100.00 *		0	0	104.68	
Internal	Loads						*			. *					
Lights		0	0		(	0.0	0 *		0	0.00 *		0	0	0.00	
People		. 0			(	0.0	0 *		0	0.00 *		0	0	0.00	
Misc		0	0	0	(	0.0	0 *		0	0.00 *		0	0	0.00	
Sub To	tal==>	0	0	0	(	0.0	* ()		0	0.00 *		0	0	0.00	
Ceiling	Load	0	0		(		0 *		0	0.00 *		0	0	0.00	
Outside (		0	0	0	(		0 *		0	0.00 *		0	0	0.00	
Sup. Fan	Heat				~ (		5 *			0.00 *			0	-4.68	
Ret. Fan			0		(		0 *			0.00 *			0	0.00	
Duct Hear			0		(		0 *			0.00 *			0	0.00	
OV/UNDR	-	0			`		*		0	0.00 *		0	0	0.00	
Exhaust			0	0	(		0 *			0.00 *			0	0.00	
Terminal	Bypass		0	0	(	0.0	* 0			0.00 *			0	0.00	
Grand To	tal==>	0	0	0	(	100.0	.,		0	100.00 *		0	0	100.00	
				LING COIL S			- (			tun tun					
								Lea			Gross Tota		S (S	f) (%)	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De					Grains		1,073			
Main Clg	0.0	0.0	0.0	0			15.4	27.9	24.9	15.2 0.0	Part	0		•	
Aux Clg	0.0	0.0	0.0 0.0	0 - 0		0.0	0.0	0.0 0.0	0.0	0.0	ExFlr Roof	. 0		0 0	
Opt Vent Totals	0.0 0.0	0.0	0.0	V	0.0	0.0	0.0		0.0	0.0	Wall	0		0 0	
			FATTON		4.3		(			NOTHEROTHO	CHECKE	TEMPERA	. TUDE	\ /5\	
			ECTION		A]					NGINEERING		TEMPERA			
	Capacity				Type	Coolin	-	Heating		% 0A	0.0	Type	Clg	-	
Main His	(Mbh)	_		Deg F	Vent		0	0	_	Cfm/Sqft	0.00 1088.50	SADB Plenum	28.0		
Main Htg	-0.(		0 35.1	35.1 0.0	Infil		0	0	_	Cfm/Ton Sqft/Ton	*****	Return	38.0 38.0		
Aux Htg	0.0		0 35.1	28.0	Supply Mincfm		0	0	-	Sqit/1011   Btuh/Sqft	0.00	Ret/OA	38.0		
Preheat Reheat	-0.6 0.6		0. 0.0	0.0	Return		0	0	_	People	0.00	Runarnd	38.0		
Keneat Humidif	0.0		0. 0.0	0.0	Exhaust		0	. 0		\$ 0A	0.0	Fn MtrTD	0.0		
Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0	-	Cfm/SqFt	0.00	Fn BldTD	0.0		
Total	0.0		v v.v	٧,٧	Auxil		0	0	-	Btuh/SqFt		Fn Frict	0.		
10001	V.1	•					•	v	,,,,,	,,, -			•••		

PAGE 5

System	2	Block	R	AD	- RADIA	TION											
						******	*****	*****	****			PEAK ****					*****
Peaked a				o/Hr: (					*			0/0			o/Hr: 13/	1	
Outside	Air ==>		OADB/W	B/HR:	0/ 0/ 0	0.0			*	0	ADB:	0 1	<b>K</b>	(	DADB: 4		
									*								
		Spac		et. Air			Net				pace	Percnt 1		e Peak	Coil Pea		Percnt
		Sens.+Lat		ensible	Latent		Total	Of To		Sens		Of Tot 1		e Sens	Tot Ser		Of Tot
Envelope		(Btuh	-	(Btuh)	(Btuh)	) (1	Btuh)	(%		(8	tuh)	(%)		(Btuh)	(Btul		(%)
Skylit			0	0			0		* 00		0	0.00 *		0		0	0.00
Skylit			0	0			0		* 00		0	0.00		0		0	0.00
Roof C			0	0			0		0 *		0	0.00 *		-4,950	-4,95		4.98
Glass			0	0			0		* 00		0	0.00 *		0		0	0.00
Glass			0	0			0		0 *		0	0.00		11,004	-11,00		11.08
Wall C			0	0			0		0 *		0	0.00 *		-7,345	-7,3		7.39
Partit			0				0	0.0			0	0.00		-885	-88		0.89
	d Floor		0				0		0 *		0	0.00		0		0	0.00
Infilt	ration		0				0	0.0	0 *		0	0.00	-	75,170	-75,17		75.66
Sub To	tal==>		0	0			0	0.0	0 *		0	0.00	· -	99,354	-99,35	4	100.00
Internal	Loads								*			*	:				
Lights			0	0			0	0.0	0 *		0	0.00 *	:	0		0	0.00
People			0				0	0.0	0 *		0	0.00 *	:	0		0	0.00
Misc		. ••	0	0	(	)	0	0.0	* 0		0	0.00	:	0		0	0.00
Sub To	tal==>		0	0	. (	)	0	0.0	0 *		0	0.00 *	:	0		0	0.00
Ceiling	Load		0	0			0	0.0	0 *		0	0.00 *		0		0	0.00
Outside	Air		0	0	(	)	0	0.0	0 *		0	0.00 *		0		0	0.00
Sup. Fan	Heat						0	0.0	* 0			0.00 *				0	0.00
Ret. Fan	Heat			0			0	0.0	0 *			0.00 *	:			0	0.00
Duct Hea	t Pkup			0			0	0.0	0 *			0.00 *				0	0.00
OV/UNDR	Sizing		0				0	0.0	0 *		0	0.00 *		0		0	0.00
Exhaust	Heat			0	0	)	0	0.0	0 *			0.00 *				0	0.00
Terminal	Bypass			0	(	)	0	0.0	0 *			0.00 *				0	0.00
									*			*					
Grand To	tal::>		0	0		)	0	0.0	0 *		0	0.00 *	-	99,354	-99,35	4	100.00
					ING COIL	SELECTIO	\N								-AREAS		
	Tota:	l Capacity	Sen		Coil Airf			g DB/W	R/HR	l ear	vina DE	B/WB/HR	Grace	Total	Glass	(ef)	(2)
	(Tons			Mbh)	(cfm)			F Gr			Deg F	Grains	Floor	2,8		(31)	(*)
Main Clg	(10/13)			0.0	(0.1)			.0	0.0	0.0	0.0	0.0	Part		342		
Aux Clg	0.0			0.0	Ö			.0	0.0	0.0	0.0	0.0	ExFlr				
Opt Vent	0.0			0.0	0			.0	0.0	0.0	0.0	0.0	Roof	2,1			0 0
Totals	0.0				·			. •	0.0	0.0	0.0	0.0	Wall			30	•
									, , ,								<b>1-1</b>
		ING COIL S							. ,	)		NGINEERING			TEMPERATU		
	Capaci		Airfl	Ent	Lvg	Type	}	Coolin	•	Heating		3 0A			* ·	lg	Htg
	(Mb)		cfm)	Deg F	Deg F	Vent			0	0		Cfm/Sqft			DB	0.0	68.1
Main Htg	-99		0	0.0	0.0	Infil			0	1,079	_	Cfm/Ton				0.0	68.0
Aux Htg		0.0	0	0.0	0.0	Supply			0	0	_	Saft/Ton			turn	0.0	68.0
Preheat		0.0	0	0.0	0.0	Mincf			0	0	-	Btuh/Saft	0.		t/OA	0.0	68.0
Reheat		0.0	0	0.0	0.0	Return			0	0		People	_		inarnd	0.0	68.0
Humidif		0.0	0	0.0	0.0	Exhaus			0	0		% 0A			MtrTD	0.0	0.0
Opt Vent	. (		0	0.0	0.0	Rm Ext	1		0	0	_	Cfm/SqFt			BldTD	0.0	0.0
Total	-99	7.4				Auxil			0	0	Htg	g Btuh/SqFt	-34.	19 Fr	Frict	0.0	0.0

System 3 Peak SZ - SINGLE ZONE

eaked a	t Time =	=>	Mo/Hr:	7/14			*	Mo/Hr:	7/17	(	Mo/Hr: 13,	/ 1	
utside	Air ==>	DA	DB/WB/HR:	91/ 74/105.	0		*	OADB	89		OADB:	4	
-		Space	Ret. Air	Ret. Air	Net			Space	e Percnt a	Space Pea	k Coil Pe	eak	Perc
		Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	e Of Tot >		s Tot Se		Of T
nvelope	Loads	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(%)	*	(Btuh)	(%)	(Btuh	) (Bt:	uh)	(
Skylit		0			0	0.00		(			0	0	0.
Skylit		0	0		0	0.00	*	(	0.00		0	0	0.
-		3,507	0		3,507	5.46	*	4,332	13.49	-3,59	2 -3,5	592	5.
	Solar	408			408			310			0	0	0.
Glass	Cond	101	0		101	0.16	*	104	0.32	-50	7 -5	507	0.
Wall C	ond	11,593	. 0		11,593	18.06	*	11,912		-22,62	1 -22,6	621	32.
Partit:		0			0		*	(	0.00		0	0	0.
Expose	d Floor	0			0	0.00	*	(	0.00		0	0	0.
Infilt		23,834			23,834	37.12		9,424	29.34	-42,47	3 -42,4	473	61.
	tal:=>	39,445	0			61.43			81.19		3 -69,1		
ternal		,			, .			,	*		,		
Lights		4,429	0		4,429	6.90	*	5,369	16.70		0	0	0.
People		700	·		700			677			0	0	0.
,		0	0	0	0			(			0	0	0.
		5,129	0	0	5,129			6,042	18.81 *		0	0	0.
	Load		0		0			. (			0	0	0.
tside #		0	0	0	17,587			(	0.00		0	0	0.
p. Fan			,			3.19			0.00 *	:		Ō	0.
t. Fan			0			0.00			0.00	•		0	0
ct Heat			0		0	0.00			0.00 \$	:		0	0
/UNDR S		0			0	0.00		(			0	0	-0.
haust 1	-		0	0	0	0.00			0.00 *	:		0	0.
	8ypass		0	0	0	0.00	*		0.00 *			0	0.
							*		*	:			
and Tot	tal==>	44,574	0	. 0	64,210	100.00	*	32,123	100.00 *	-69,19	3 -69,1	193	100.
			cnn	IING COIL SE	FLECTION						ARFAS		
									DB/WB/HR				
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Grai	ns	Deg F Deg	F Grains	Floor	1,354		
n Clg									.0 61.5		0		
Clg	0.0	0.0	0.0	0			.0		0.0	ExFlr	0		
Vent	0.0	0.0	0.0	0			.0		.0 0.0	Roof	1,354		0
als	5.4	64.2								Wall	1,386	!	14
	HFATIN	G COIL SELE	ECTION		AI	RFLOWS (c	fm)-		ENGINEERING	CHECKS	TEMPERAT	TURES	(F)-
	Capacit				Туре	Cooling			Clg % OA	28.1		Clg	H
	(Mbh)	*			Vant	450		•	Clg Cfm/Sqft	1.18	SADB	56.6	
n Htg	-69.				Infil	610			Clg Cfm/Ton	299.02	Plenum	75.0	
Htg	0.		0 0.0		Supply	1,600			Clg Sqft/Ton	253.05	Return	75.0	
heat	-9.				Mincfm	0			Clg Btuh/Sqft		Ret/OA	79.4	
eat	Ó.		0 0.0		Return	1,600			No. People	9	Runarnd	75.0	
idif	0.		0 0.0		Exhaust	450			Htg % OA	0.0	Fn MtrTD	0.3	
	0.		0 0.0			200			Htg Cfm/SqFt	1.18	Fn BldTD	0.2	
Vent	U.	. U	0.0	0.0	Rm Exh	200		0	HIQ CIM/SUFL	1.10	TH DIGID	V.2	

System 4 Peak SZ - SINGLE ZONE

eaked a utside	t Time =: Air ==>	:> OA	Mo/Hr: 1 DB/WB/HR: 1	7/14 91/ 74/105.	0		*	Mo/H Oad		•		Mo/Hr: OADB:		
							*			*				
	,	Space		Ret. Air		t Percnt			ce					Per
		Sens.+Lat.			Total			Sensib.		Of Tot *				Of 1
nvelope		•	(Btuh)	-	(Btuh)			(Btu	,	(%) *		ıh) (	-	^
Skylit		0			(				0	0.00 *			0	0
Skylit		7 750				0.00			-	0.00 *	-3,3	0 150	-	4
Roof C		3,258				5.98							3,358	0
Glass		3,128	0		3,128			2,4		7.03 *		661 -:	0 541	
Glass		504	0		504				12	1.49 *				
Wall C		11,116	0		11,116			12,96		37.69 *		301 -2:		
Partit		0			(					0.00 *			0	0
	d Floor	0			00.44			0.0	0	0.00 *	40.0			
Infilt		20,447			20,447					25.98 *		266 -40		
Sub To		38,453	0		38,453	70.60		28,80	U3	83.74 *		86 -6	5,400	100
ternal					2 407		*	4.50	r 0	*		۸	^	
Lights		4,025	0		4,025					14.42 *		0	0	0
People		703			703			63		1.84 *		0	0	0
Misc		. 0	0	0	(					0.00 *		0	0	0
	tal==>		0	0	4,727			•		16.26 *		0	0	0
-	Load	0	0	^	0.711					0.00 *		0	0	0
tside		0	0	0	8,311				0	0.00 *		0	0	0
ip. Fan					2,976					0.00 *			0	0
t. Fan			0			0.00				0.00 *			0	0
ct Hea			0			0.00			^	0.00 *		^	0	0
/UNDR	_	0		^	_	0.00			0	0.00 *		0	0	0
haust			0	0		0.00				0.00 *			0	0
rminai	Bypass		0	0	C	0.00	*			0.00 *			0	0
and To	tal==>	43,180	0	. 0	54,467	100.00		34,39	94		-68,4	86 -61	3,486	100
			0001	ING COTE SE	FLECTION							AREAS		
			Sens Cap.										ass (si	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Gra	ins	Deg F De	eg F	Grains	Floor	1,266		
n Clg	4.5		39.1								Part	0		
Clg	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	ExFlr	0		
Vent	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	Roof	1,266		0
als	4.5	54.5									Wall.	1,314		71
	HEATIN	G COIL SEL	ECTION			RFLOWS (				NGINEERING		TEMPE	RATURES	S (F)
	Capacit	-			Type	Cooling		Heating		% OA	10.1	Type	Çlg	
	(Mbh)			Deg F	Vent	235				Cfm/Sqft	1.84	SADB	61.4	
n Htg	-68.			95.1	Infil	578		578		Cfm/Ton	512.24	Plenum	75.0	
Htg	0.			0.0	Supply	2,325		2,325	_	Sqft/Ton	278.92	Return	75.0	
heat	-0.		325 61.5	60.2	Mincfm	Ō		0	_	Btuh/Sqft		Ret/OA	76.6	
eat	0.		0.0	0.0	Return	2,325		2,325		People		Runarnd	75.0	
idif	0.		0.0	0.0	Exhaust	235		0		% OA	0.0	Fn MtrTi		
Vent	0.	.0	0.0	0.0	Rm Exh	0		0	_	Cfm/SqFt		Fn BldT		
al	-68.	-			Auxil	0		0		Btuh/Sqft	-54.10	Fn Fric	t 0.	7

System 5 Block VAV - VARIABLE AIR VOLUME

Peaked a	t Time ==	>	Mo/Hr:	7/14			*	Mo/Hr	: 7/17 3		Mo/Hr: 13/ 1	
Outside	Air ==>	0A	DB/WB/HR:	7/14 91/ 74/105.	0		*	0AD8	: 89	k k	OADB: 4	
		Space	Ret. Ai	Ret. Air	Net	Percnt	*	Space	e Percnt	Space Peak	Coil Peak	Percn
	S	ens.+Lat.	Sensible	e Latent	Total	Of Tot	*	Sensible	e Of Tot a		Tot Sens	Of To
Envelape	Loads	(8tuh)	(Btuh)	Latent (8tuh)	(Btuh)	(%)	*	(Btuh)	(%)	(Btuh)	(Btuh)	(\$
Skylit	e Soir	0	(	)	0	0.00	*	(	0.00	0	. 0	0.0
Skylit	e Cond	0	(	)	0	0.00	*	(	0.00	٠ 0	0	0.0
Roof C	ond	0		)		0.00		(	0.00		0	0.0
Glass	Solar	4,737		)	4,737	9.40	*	8,710	42.05	t 0	0	
Glass	Cond	1,101	(		1,101	2.19	*	1,126	5.44	-5,505	-5,505	28.5
Wall C	ond	207	24	ļ	231	0.46	*	210	1.01 4	-818	-914	4.7
Partit	ion	0			. 0	0.00	*	(	0.00		0	0.0
Expose	d Floor				0	0.00	*	(	0.00	. 0		0.0
Infilt	ration	7,983			7,983	15.85	*	2,856	13.79	-12,871	-12,871	66.7
Sub To	tal==>	14,027	24	ļ	14,052				62.29 *		-19,289	
Internal	Loads						*				,	
Lights		5,718	(	)	5,718	11.35	*	6,926	33,44 *	0	0	0.0
People		904			904	1.79	*	874		0	0	0.0
Misc		·- , 0	(	0	0	0.00	*	(		0	0	0.0
Sub To	tal:=>	6,622	(	0	6,622	13.15	*	7,800	37.66 *	0	0	0.0
Ceiling	Load	3	-3	}	0			·	0.04 *		0	0.0
utside i		0	0	0	28,750	57.08		(			0	0.0
	Heat				947				0.00 *		0	0.0
et. Fan			0	1	0	0.00	*		0.00 *		0	0.0
uct Hea			0	1	0	0.00	*		0.00 *	:	0	0.0
V/UNDR		0			0	0.00	*	0	0.00 *	. 0	0	0.0
xhaust	_		-4	. 0	- 4				0.00 *		0	0.0
	Bypass		0	0	0				0.00 *		0	0.0
	•						*		*			
rand To	tal==>	20,653	17	. 0	50,366	100.00	*	20,710	100.00 *	-19,289	-19,289	100.0
			coo	LING COIL SE	ELECTION						AREAS	
	Total (	Capacity	Sens Cap.	Coil Airfl	Enteri	ng D8/W8/	HR	Leaving	DB/WB/HR	Gross Total	Glass (s	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Grai	ns	Deg F Deg	F Grains	Floor 1	,748	
in Clg	4.2	50.4	27.6	666	90.5 7	4.3 105	.0	52.5 51	.3 55.8	Part	0	
x Clg	0.0	0.0	0.0	0			.0		.0 0.0	ExFlr	0	
t Vent	0.0	0.0	0.0	0	0.0	0.0 0	.0	0.0	.0 0.0	Roof	0	0
tals	4.2	50.4								Wall .	420	153 3
	HEATING	COIL SEL	ECTION		AI	RFLOWS (c	fm)-		ENGINEERING	CHECKS	TEMPERATURE	S (F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Н	eating	Clg % OA	100.0	Type Clg	Htg
	(Mbh)	(cfi	n) Deg F	Deg F	Vent	896		0	Clg Cfm/Sqft	0.51	SADB 53.	
in Htg	-19.3	3	0.0	0.0	Infil	185		185	Clg Cfm/Ton	213.55	Plenum 75.	0 67.
x Htg	0.0	)	0.0	0.0	Supply	896		0	Clg Sqft/Ton	416.47	Return 75.	0 67.
eheat	-47.3	3 .	396 4.0	52.5	Mincfm	0		0	Clg Btuh/Sqft	28.81	Ret/0A 90.	
heat	-0.0	)	0.0	0.0	Return	896		0	No. People	11 .	Runarnd 75.	
midif	0.0	)	0.0	0.0	Exhaust	896			Htg % OA		Fn MtrTD 0.	
t Vent	0.0	)	0.0	0.0	Rm Exh	0			Htg Cfm/SqFt	0.00	Fn BldTD 0.	
tal	-66.6				Auxil				Htg Btuh/SqFt			7 0.

System 6 Peak SZ - SINGLE ZONE

Peaked a	t Time ==>		Mo/Hr:	7/14			* M	o/Hr:	7/17 *		Mo/Hr:		
Outside	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		* (	DADB:	89 *		0AD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* (	Space	Percnt *		eak Coi!	l Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot		sible	Of Tot *	•		Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		Btuh)	(%) *	•		(Btuh)	(\$)
Skylit	e Solr	0	0		0	0.00	*	0	0.00 *		0	Ó	0.00
Skylit	e Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Roof C	ond	0	0		0			0	0.00 *		0	0	0.00
Glass		5,265	0		5,265			,850			0	0	0.00
Glass		1,038	0		1,038			,030	3.73 *		269 -	5.269	
Wall C		5,136	537		5,672			,044	21.88 *	_		22,138	35.25
Partit		,			0			0	0.00 *			0	0.00
	d Floor	0			0			0	0.00 *		0	0	0.00
Infilt		13,035			13,035			,853	28.42 *		394 -3	_	
Sub To		24,473	537		25,010			,776	75,20 *		704 -6		
Internal		21,770			20,020		*	.,	*	=		2,002	100.00
Lights		4,972	0		4,972	6.55	*	,981	21.65 *		0	0	0.00
People		861	•		861	1.13		782	2.83 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	Ō	0.00
	tal==>		0	0	5,833	7.68		,763	24.48 *		0	0	0.00
Ceiling		75	-75	•	0	0.00		88	0.32 *		253	0	0.00
Outside (		0	0	0	41,038			0	0.00 *		0	Ŏ	0.00
Sup. Fan		•	·	•	4,243	5.59		•	0.00 *		•	0	0.00
Ret. Fan			0		0				0.00 *			ō	0.00
Duct Heat			0		0				0.00 *			0	0.00
OV/UNDR S		0	•		0			0	0.00 *		0	ō	-0.00
Exhaust 1	_	•	-181	0	-181			•	0.00 *		·	0	0.00
Terminal			0	0	0				0.00 *			0	0.00
701	-/		·	·	•		<b>*</b>		*			•	0.00
Grand Tot	tal==>	30,381	281	. 0	75,943	100.00	* 27	,627	100.00 *	-60,9	957 -6	2,801	100.00
			C00L	ING COIL S	ELECTION						AREAS		
	Total C	apacity	Sens Cap.	Coil Airfl	Enterin	g D8/W8/H	R Lea	ving D	B/WB/HR	Gross Tot	al Gl	ass (sf	f) (%)
-	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grain	s Deg F	Deg F	Grains	Floor	1,564		
Main Clg	6.3	75.9	57.1	3,315	82.6 71	.0 98.	4 66.2	64.6	91.2	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	0		0 0
Totals	6.3	75.9								Wall.	1,155	1	146 13
	HEATING	COIL SEL	ECTION		AIR	FLOWS (cfi	m)		ENGINEERING	CHECKS	TEMPE	RATURES	S (F)
		Coil A				Cooling	Heating		g % OA	48.3	Type	Clg	
	(Mbh)	(cf		Deg F	Vent	1,600			g Cfm/Sqft	2.12	SADB	67.3	
Main Htg	-62.8	3,		84.9		508	508		g Cfm/Ton	523.82	Plenum	75.2	
Aux Htg	0.0			0.0	Supply	3,315	3,315		g Saft/Ton	247.13	Return	75.2	
Preheat	-105.8	3,		66.2	Mincfm	0	0		g Btuh/Sqft		Ret/OA	82.6	
Reheat	0.0	•	0.0	0.0	Return		3,315		. People	10	Runarnd		
			0.0	0.0	Exhaust	1,108	0,010		g % OA		Fn MtrT		
Humidif	U.U		0 0.0	V.V	FVIIdAZ	1,100	U	111	, y & UR	υ.υ	F H TILL I	v v	
Humidif Opt Vent	0.0 0.0		0 0.0	0.0	Rm Exh	1,000	0		g Cfm/SqFt		Fn BldT		

System 7 Peak SI - SINGLE ZONE

	t Time =		Mo/Hr:				*	Mo/Hr:			Mo/Hr:		
Outside	Air ==>	0/	HDB/WB/HR:	91/ 74/105.	0		*	OAD8:	91 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Ne	t Percnt	*	Space	Percnt *	Space	Peak Coil	Peak	Percnt
		Sens.+Lat.	Sensible	Latent	Tota	l Of Tot	* S	ensible	Of Tot *	•		Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh	(%)	*	(Btuh)	(%) *			8tuh)	(\$)
	e Solr	0	0			0.00		0	0.00 *	-	0	Ó	0.00
_	e Cond	0	0			0.00	*	0	0.00 *		0	0	0.00
Roof C		0	0			0.00	*	0	0.00 *		0	0	0.00
Glass		0	0			0 0.00	*	0	0.00 *		0	0	0.00
Glass	Cond	0	0			0.00	*	0	0.00 *		0	0	0.00
Wall C	ond	0	0			0.00	*	0	0.00 *		0	- 0	0.00
Partit		78			7	8 0.03	*	78	99.95 *		-280	-280	99.98
	d Floor	0				0 0.00	*	0	0.00 *		0	0	0.00
Infilt		0				0.00		0	0.02 *		0	0	0.02
Sub To		78	0		7			78	99.97 *		-280	-280	100.00
Internal			·		·	,,,,,	*		*				
Lights		0	- 0			0.00	*	0	0.00 *		0	0	0.00
People		0				0.00		0	0.00 *		0	0	0.00
Misc		0	0	0		0.00		0	0.00 *		0	0	0.00
Sub To	tal==>	0	0	0	i	0.00	•	0	0.00 *		Ö	0	0.00
Ceiling		0	0			0.00		0	0.00 *		0	0	0.00
Outside		0	0	0	224,97			0	0.00 *		Ö	0	0.00
Sup. Fan						0.00			0.00 *			0	0.00
Ret. Fan			0			0.00			0.00 *			0	0.00
Duct Hea			0			0.00			0.00 *			0	0.00
OV/UNDR :		0				0.00		0	0.03 *		0	0	0.00
Exhaust	_		0	0	i	0.00			0.00 *			0	0.00
Terminal			0	0		0.00			0.00 *			0	0.00
							*		*				
Grand To	tal==>	78	0	. 0	225,05	7 100.00	*	78	100.00 *		-280	-280	100.00
			coc	LING COIL S	ELECTION						AREAS		
			Sens Cap.			ing DB/WB	/HR I	Leaving (	OB/WB/HR	Gross To			f) (%)
	(Tons)	(Mbh)		(cfm)				_	F Grains	Floor	469	(	, (,,
lain Clg	•	225.1			-				7 67.5	Part	108		
ux Clg	0.0	0.0	0.0	0	0.0		0.0			ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0		0.0			Roof	0		0 0
otals	18.8	225.1								Wall .	0		0 0
	HEATIN	IG COIL SEL	ECTION		A	TRELOWS (	:fm)		-ENGINEERING	CHECKS	TEMPER	RATURES	S (F)
	Capacit			Lvg	Туре	Cooling	Heati		lg % OA	100.0	Туре	Clg	
	(Mbh)			Deg F	Vent	5,220		•	lg Cfm/Sqft	11.13	SADB	75.0	_
lain Htg	-0.		220 68.0	68.0	Infil	0,220			lg Cfm/Ton	278.34	Plenum	75.0	
ux Htg	0.	-	0 0.0	0.0	Supply	5,220	5,2		lg Sqft/Ton	25.01	Return	75.0	
reheat	-403.		220 4.0	75.0	Mincfm	0,220	-,,		lg Btuh/Sqft	479.87	Ret/OA	90.5	
leheat	0.	-	0 0.0	0.0	Return	0	5,2		. People	0	Runarnd	75.0	
lumidif	0.		0 0.0	0.0	Exhaust	0	-,,		tg % OA	0.0	Fn MtrT(		
	0.		0 0.0		Rm Exh	5,220			tg Cfm/SqFt	11.13	Fn BldT		
pt Vent	4,1	1/			11th LA11	1 // / / /		U n	Lu Cimioni	11.1.1			

System 8 Peak SZ - SINGLE ZONE

Jystem	8	roan	32	STREEL	ZUKL							
					*******					***** HEAT		
	t Time ==>		Mo/Hr:					/Hr: 7			Mo/Hr: 13/	
Dutside	Air ==>	UAL	)R/MR/HK:	91/ 74/105.	0		* 0	ADB: 8	89 *		OADB: 4	
			0 1 4.		h v		* .		A 4	0 0	h 0-21 0-	.l. 0
		Space		Ret. Air		Percnt		pace	Percnt *			
- 1		ns.+Lat.	Sensible			Of Tot	,		Of Tot *			
Envelope		(Btuh)	(Btuh)		(Btuh)			tuh)	(%) *		) (Btu	
	e Solr	0	0		0			- 0	0.00 *		0	0.00
•	e Cond	0	0		0			0	0.00 *		0	0.00
Roof C		0	0		0			0	0.00 *		0	0.00
Glass		3,300	0		3,300			,400	15.40 *		0	0.00
Glass		532	0		532			536	3.44 *		2 -2,70	
Wall C		3,316	349		3,666			,055	26.03 *			
Partit		0			. 0			0	0.00 *		0	0.00
	d Floor	0			0			0	0.00 *		0	0.00
	ration	8,511			8,511			,814			1 -17,19	
	tal==>	15,660	349		16,009			,805	69.35 *		1 -30,5	57 100.00
Internal							*		*			
Lights		3,405	0		3,405			,145	26.60 *		0	0.00
People		594			594			536	3.44 *		0	0 0.00
Misc		. 0	0		0			0	0.00 *		0	0.00
		3,999	0		3,999			,681	30.04 *		0	0.00
Ceiling		77	-77		0			94	0.61 *			0.00
Outside		0	0	0	3.793			0	0.00 *		0	0.00
Sup. Fan					1,408				0.00 *			0.00
Ret. Fan			0		0				. 0.00 *			0.00
Duct Hea			0		Q.				0.00 *		_	0.00
OV/UNDR	_	0			0			0	-0.00 *		0	0.00
Exhaust			-27		-27				. 0.00 *			0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0.00
							*		*			
Grand To	tal==>	19,736	245	. 0	25,182	100.00	* 15	,580	100.00 *	-29,76	5 -30,5	57 100.00
					ELECTION						AREAS	
				Coil Airfl		-		-		Gross Tota		(sf) (%)
	(Tons)	(Mbh)	(Mbh)			-	_		Grains		1,071	
Main Clg	2.1	25.2	18.6	1,100		6.1 81.		59.0	73.9	Part	0	
Aux Clg	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0	Roof	0	0 0
Totals	2.1	25.2								Wall .	561	75 13
	HEATING	COIL SELE	CTION		AI				ENGINEERING		TEMPERATE	
	Capacity			Lvg	Type	Cooling	Heating		3 % OA	10.0		Clg Htg
	(Mbh)	(cfm	) Deg F	Deg F		110	0	_	g Cfm/Sqft	1.03		52.0 92.9
Main Htg	-30.6	1,1	00 67.3	92.9	Infil	247	247	_	g Cfm/Ton	524.18		75.2 <b>67.</b> 3
Aux Htg	0.0		0.0	0.0	Supply	1,100	1,100	_	g Sqft/Ton	510.36		<b>75.2 67.</b> 3
Preheat	-0.0	1,1	00 61.0	60.8	Mincfm	. 0	0	Clg	g Btuh/Sqft	23.51	Ret/OA	<b>76.8 67.</b> 3
Reheat	0.0	•	0.0	0.0	Return	1,100	1,100		. People	7	Runarnd	75.0 68.0
Humidif	0.0		0 0.0	0.0	Exhaust	110	0	Htg	8 0A	0.0	Fn MtrID	0.3 0.0
Opt Vent	0.0		0 0.0	0.0	Rm Exh	0	0	Htg	g Cfm/SqFt	1.03	Fn BldTD	0.2 0.0
Total	-30.6				Auxil	0	0	Htg	g Btuh/SqFt	-28.53	Fn Frict	0.7 0.0
	20.0							•				

System 9 Peak SZ - SINGLE ZONE

eaked at	t Time ==	>	Mo/Hr:	7/14	0		* Mo	o/Hr:	7/15 *		Mo/Hr: 13/ 1	
utside A	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		* (	JADE:	91 *		OAD8: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* 5		Percnt *	•		Perc
		ens.+Lat.	Sensible		Total	Of Tot	* Sens	sible		•		Of T
nvelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* ({	3tuh)	(%) *	(8tuh)	, ,	
Skylite	e Solr	0	(	)	0	0.00	*	0	0.00 *	0	0	0.
Skylite		0	(	)	0	0.00	*	0	0.00 *	0		
Roof Co	ond	1,065	(	)	1,065	5.08	* 1	,232	11.99 *	-1,238	-1,238	5.
Glass S		2,026	(	)	2,026	9.65	* 1	,882	18.31 *	0	0	0.
Glass C	Cond	514	(	)	514	2.45	*	541	5.27 *	-2,607	-2,607	11.
Wall Co	ond	485	(	)	485	2.31	*	516	5.02 *		-1,633	7.
Partiti	ion	0			0	0.00	*	0	0.00 *	0	0	0.
	Floor				0	0.00	*	0	0.00 *	0	0	0.
Infiltr	ration	5,917			5,917	28.19	* 4	,214	41.00 *	-16,854	-16,854	75.
Sub Tot	tal==>	10,007	(	)	10,007				81.58 *		-22,333	
ternal		1 1			- • - • •		*	,	*			
Lights		1,729	(	)	1,729	8.24	* 1	,729	16.83 *	0	0	0
People		311	·		311			163	1.59 *		0	0
Misc		0	(	0	0	0.00	*	0	0.00 *	0	0	0
		2,040	(	0	2,040			,893	18.42 *	0	. 0	0
	oad	0	(	)	0			0	0.00 *		0	0
tside A		0	(	0	8,302			0	0.00 *		0	0
p. Fan					142				0.00 *		0	0
t. Fan			(	)	0	0.00			0.00 *		0	0
ct Heat			(	)		0.00			0.00 *		0	0
/UNDR S		0			0			0	-0.00 *		0	0
haust h			(	0	0				0.00 *		0	0
	Bypass		0	0	0	0.00			0.00 *		. 0	0
	•					٠	*		*			
and Tot	al==>	12,048	C	. 0	20,992	100.00	* 10	,277	100.00 *	-22,333	-22,333	100
			000	LING COIL SI	ELECTION						AREAS	
	Total	Capacity	Sens Cap.	Coil Airfl	Enteria	ng DB/WB/H	IR Lea	ving [	OB/WB/HR	Gross Total	Glass (s	sf) (9
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	g F Grain	s Deg F	Deg f	Grains	Floor	544	
n Clg	1.7	21.0	16.3	1,000	80.6 70	).3 97.	9 65.4	64.4	91.6	Part	0	
Clg	0.0	0.0	0.0	0		0.0 0.		0.0		ExFlr	0	
Vent	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0	Roof	544	0
als	1.7	21.0					•			Wall .	550	72
	HEATIN	G COIL SEL	ECTION		AI	RELOWS (cf	m)		-ENGINEERING	CHECKS	TEMPERATURE	S (F)
	Capacit				Type	Cooling	Heating		lg % OA	36.0	Type Clo	3 H
	(Mbh)		m) Deg F	Deg F	Vent	360		C1	lg Cfm/Sqft	1.84	SAD8 65.	6 8
n Htg	-22.		000 68.0	_	Infil	242	242		lg Cfm/Ton		Plenum 75.	
Htg	0.		0 0.0		Supply	1,000	1,000		lg Sqft/Ton		Return 75.	
heat	-22.		000 45.0		Mincfm	0	_,,,,,		lg Btuh/Sqft		Ret/0A 80.	
eat	0.	-	0 0.0		Return	1,000	1,000		. People		Runarnd 75.	
idif	0.		0 0.0		Exhaust	360	2,000		tg % OA		Fn MtrTD 0.	
	0.		0 0.0		Rm Exh	0	Ċ		tg Cfm/SqFt		Fn BldTD 0.	
Vent	υ.	U	V V. V	0.0	1/10 EVII	U		, ,,,,	og o im/oui c	¥ + U T	1 11 UZU1U U.	

System 10 Peak SZ - SINGLE ZONE

oystem	10											
******	******	****** C	OOLING COIL	PEAK ****	******	*******	**** CLG	SPACE	PEAK ****	***** HEAT	ING COIL PEA	\K ******
Peaked at	t Time ==	>	Mo/Hr:	7/14		*	Mo,	/Hr: 7	/17 *		Mo/Hr: 13/	1
Outside /	Air ==>	<b>0</b> A	DB/WB/HR:	91/ 74/105.	0	*	0/	ADB: 8	9 *		OADB: 4	
						*			*			
		Space	Ret. Air	Ret. Air	Net	Percnt *	S	pace	Percnt *	Space Pea	k Coil Pea	k Perchi
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot *	Sensi	ible	Of Tot *	Space Sen	s Tot Ser	s Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(8tuh)	(Btuh)	(%)	(8)	tuh)	(%) *	(Btuh	) (Btul	1) (%)
Skylite	e Solr	0	0		0	0.00 *		0	0.00 *		0	0.00
Skylite	e Cond	0	0		0	0.00		0	0.00 *		0	0.00
Roof Co	and	0	0		0	0.00		0	0.00 *		0	0.00
Glass S	Solar	4,550	0		4,550	10.74	4	,777	23.12 *		0	0.00
Glass C	Cond	807	0		807	1.90 *		820	3.97 *	-4,09	8 -4,09	8 11.28
Wall Co	ond	3,085	343		3,428	8.09	3,	,726	18.03 *	-10,78	9 -11,99	90 33.02
Partiti	ion	0			. 0	0.00 *		0	0.00 *		0	0 0.00
Exposed	floor	0			0	0.00		0	0.00 *		0	0.00
Infiltr	ration	7,395			7,395	17.45 *	4,	,487	21.72 *	-20,22	5 -20,22	25 <b>55.7</b> (
Sub Tot	cal==>	15,837	343		16,181	38.19	13,	,810	66.83 *	-35,11	2 -36,31	13 100.00
Internal	Loads					*			*		•	
Lights		4,886	0		4,886			020	29.13 *		0	0 0.00
People		853			853			769	3.72 *		0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0 0.00
Sub Tot	:al==>	5,739	0	0	5,739			,788			0	0.00
Ceiling L		54	-54		0			65	0.32 *		9	0.00
Outside A	\ir	0	0	0	19,864			0	0.00 *		0	0.00
Sup. Fan					683				0.00 *			0.00
Ret. Fan			0		0				0.00 *			0.00
Duct Heat			0		0				0.00 *			0.00
OV/UNDR S		0			0			0	0.00 *		0	0 -0.00
Exhaust H			-94	0	-94				0.00 *			0.00
Terminal	Bypass		0	0	0	0.00 *			0.00 *			0.00
		01 /71	100		40.730	*			*			7 (00 0)
Grand Tot	;al==>	21,631	195	0	42,372	100.00 *	20,	,663	100.00 *	-35,30	1 -36,31	13 100.00
				LING COIL SE							AREAS	
			Sens Cap.							Gross Tota		(sf) (%)
	(Tons)	(Mbh)	(Mbh)		Deg F Deg	-					1,537	
Main Clg	3.5	42.4	32.8	2,400		9.9 96.5		65.0	92.1	Part	0	
Aux Clg	0.0	0.0	0.0	0		0.0		0.0	0.0	Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	0	0 (
Totals	3.5	42.4								Wall .	660	114 17
	HEATIN	G COIL SEL	ECTION		AI	RFLOWS (cfm	)	E	NGINEERING	CHECKS	TEMPERATU	RES (F)
	Capacit	y Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Çlg	% OA	32.5	Type (	lg Htg
	(Mbh)	(cf	m) Deg F	Deg F	Vent	780	0	Clg	Cfm/Sqft	1.56		7.1 81.5
Main Htg	-36.	3 2,	400 67.6	81.5	Infil	290	290		Cfm/Ton	679.69	Plenum 7	5.1 67.6
Aux Htg	0.	0	0.0	0.0	Supply	2,400	2,400	-	Sqft/Ton	435.28		5.1 67.6
Preheat	~51.	9 2,	400 46.9	66.8	Mincfm	0	0	Clg	8tuh/Sqft	27.57	Ret/OA 8	30.1 67.6
Reheat	0.	0	0.0	0.0	Return	2,400	2,400		People	10		5.0 68.0
Menear		•	0 0.0	0.0	Exhaust	700	Λ.	ii ii a	6 DA	Λ Λ	Fn MtrTD	0.1 0.0
	0.	U			Exhaust	780	0		% OA	0.0		
Humidif Opt Vent Total	0.		0 0.0	0.0	Rm Exh Auxil	0	0	Htg	Cfm/SqFt Btuh/SqFt	1.56	Fn BldTD	0.0 0.0 0.1 0.0

System 11 Peak SZ - SINGLE ZONE

	t Time ==		Mo/Hr:			*		/Hr: 7	•		Mo/Hr:		
Outside (	Air ==>	0AI	DB/WB/HR:	91/ 74/105.0	0	:	k 0:	AD8: 7	79 <b>*</b>	÷	OADB:	- 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	S	pace	Percnt *	Space	Peak Coil	Peak	Percni
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot		ible	Of Tot *	•	Sens Tot	Sens	Of Tot
nvelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	(B:	tuh)	(%) *	(8	tuh) (	Btuh)	(%)
Skylite	e Solr	0	0		0	0.00	•	0	0.00 *		0	0	0.00
Skylite	e Cond	. 0	0		0	0.00	t	0	0.00 *		0	0	0.00
Roof Co	ond	0	0		0	0.00	(	0	0.00 *		0	0	0.00
Glass S	Solar	0	0		0	0.00	(	0	0.00 *		0 .	0	0.00
Glass (	Cand	0	0		0	0.00	(	0	0.00 *		0	0	0.00
Wall Co	ond	0	0		0	0.00	(	0	0.00 *		0	0	0.00
Partiti	ion	0			. 0	0.00	:	0	0.00 *		0	0	0.00
Exposed	d Floor	0			0	0.00	t	0	0.00 *		0 .	0	0.00
Infiltr		0			0	0.00		0	0.00 *		0	0	60.74
Sub Tot		0	0		0			0	0.00 *		0	0	60.74
nternal			_			1			*				
Lights		13,815	0		13,815	10.50	18	290	76.69 *		0	0	0.00
People		2,183			2,183				23.31 *		0	0	0.00
Misc		0	0	0	0			0	0.00 *		0	0	0.00
		15,998	0	0	15,998			851	100.00 *		0	0	0.00
eiling L		0	0		0			0	0.00 *		0	0	0.00
utside A		0	0	0	99,839	75.85 *		0	0.00 *		0	0	0.00
up. Fan					15,787	11.99			0.00 *			0	0.00
et. Fan			0		0	0.00 *			0.00 *			0	0.00
uct Heat			0		0	0.00			0.00 *			0	0.00
V/UNDR S	•	0			0	0.00 *		0	0.00 *		0	0	39.26
xhaust F			0	0	0	0.00			0.00 *			0	0.00
erminal			0	0	0	0.00 *			0.00 *			0	0.00
	7,					*			*				
rand Tot	:al==>	15,998	0	. 0	131,624	100.00 *	23	851	100.00 *		0	0	100.00
			cooi	LING COIL SE	ELECTION						AREAS		
				Coil Airfl									(%)
				(cfm)		g F Grains				Floor			
in Clg				11,100		1.6 102.7	71.7	68.4	101.9	Part	. 0		
x Clg	0.0	0.0	0.0	0		0.0 0.0		0.0	0.0	ExFlr	0		
t Vent	0.0	0.0	0.0	0	0.0	0.0 0.0	0.0	0.0	0.0	Roof	0		0 (
tals	11.0	131.6								Wall.	0		0 (
	HEATIN	G COIL SELE	CTION		AI	RFLOWS (cfm	)	E	NGINEERING	CHECKS	TEMPE	RATURES	(F)
	Capacit				Type	Cooling	Heating	Clg	% 0A	45.4	Type	Clg	Htg
	(Mbh)			_	Vent	5,040	0		Cfm/Sqft	2.63	SADB	73.0	
in Htg	-1.:	•		_	Infil	0	0	_	Cfm/Ton	1011.97	Plenum	75.0	
x Htg	0.		0 0.0		Supply	11,100	11,100	_	Sqft/Ton	385.00	Return	75.0	
eheat	<b>-3</b> 95.				Mincfm	0	0	-	Btuh/Sqft		Ret/OA	82.0	
	0.		0 .0.0		Return	11,100	11,100	_	People	28	Runarnd		
		-				•							
heat		0	0 0.0	0.0	Exhaust	5.040	0	Hta	1 % UA	0.0	th Mtri	0.3	) 0.0
heat midif t Vent	0.		0 0.0		Exhaust Rm Exh	5,040 <b>0</b>	0	_	% OA   Cfm/SqFt	0.0 2.63	Fn Mtr⊺ Fn BldT		

System 12 Peak SI - SINGLE ZONE

eaked a	t Time ==>		Mo/Hr:	7/14			*			7/20			: 13/ 1	
Outside	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		*	0	AD8:	83 3		OADB	: 4	
		Space	Ret. Air	Ret. Air	Net	Percn	t. *	S	pace	Percnt 1		eak Co	il Peak	Perc
	Se	ns.+Lat.	Sensible	Latent	Total	Of To	t *	Sens	ible	Of Tot *	Space S	ens T	ot Sens	Of T
nvelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%	) *	(8	tuh)	(%)	(Bt	uh)	(8tuh)	(
Skylit	e Solr	0	0		0	0.0	0 *		0	0.00	:	0	0	0.
Skylit	e Cond	. 0	0			0.0	0 *		0	0.00		0	0	0.
Roof C	ond	3,816	0		3,816	0.8	7 *	4	,109	7.20 *	-4,	473	-4,473	20.
	Solar	0	0		0	0.0	0 *		0	0.00 *		0	0	0.
Glass	Cond	0	0		0	0.0	0 *		0	0.00		. 0	0	0.
Wall C	ond	384	0		384	0.0	9 *		481	0.84 *	-1,	693	-1,693	7.
Partit		. 0			0	0.0	0 *		0	0.00 *		0	0	0.
	d Floor				0		0 *		0	0.00 *		0	0	0.
	ration	0			0		0 *		0	0.00 *		169	-15.169	
	tal==>	_	0		4,199		6 *			8.04 *		334		
nternal		13.27	·		.,.,,		*	7	, *	*			,,-	
Lights		6,341	0		6.341	1.4	5 ¥	8	. 153	14.28		0	0	0.
		1,049	v		1,049				.032	3.56 *		0	0	0.
Misc		9 082	32 486	3,840						14.83 *		0	0	0.
					52,798	12.0				32.66		Ö	0	0.
ilina:	Load	10,412	32,486	0,040	32,770					0.00 *		0	0	0.
_	Air	0	0	0	311,339				õ	0.00 *		0	0	0.
ip. Fan	nıı Vəst	V	V	V	35,840				٠	0.00 *		·	0	0.
t. Fan			. 0		03,540		0 *			0.00 \$			0	0.
ict Hea			0			0.0				0.00 *			0	0.
	Sizing	77 040	•	0	33,869				.869			0	0	0.
chaust		44,007	. 0	٥	00,007	0.0		Çu		0.00 *		v	0	0.
	Bypass		0		ő		) *			0.00 *			ō	0.
Hillial	pypass		V	. •	V	V. 3	*			*			v	0.
and To	tal==>	54,540	32,486	3,840	438,045	100.0	0 *	57	,111	100.00 *		334 -	-21,334	100.
			c00	LING COIL SE	ELECTION							ARE	AS	
	Total C	apacity	Sens Cap.	Coil Airfl	Enteri	ng DB/W	B/HR	Leav	ving (	DB/WB/HR	Gross To			
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Gr	ains	Deg F	Deg 1	F Grains	Floor	1,966		
in Clg	36.5	438.0	364.3	18,000	89.5 7	3.8 1	03.6	70.3	67.	4 99.0	Part	0		
Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0		ExFlr	0		
: Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,966		0
als		438.0									Wall .	495		0
	HEATING	COIL SEL	ECTION		AI	RFLOWS	(cfm)			-ENGINEERING	CHECKS	TEM	PERATURE	s (F)-
	Capacity	Coil A	irfl Ent	-	Type	Coolin	-	Heating		lg % OA	80.0	Type	_	
	(Mbh)	(cf	m) Deg F		Vent	14,400		0		lg Cfm/Sqft	9.16	SADB		
in Htg	-21.3	18,	000 68.0		Infil	(	0	218		lg Cfm/Ton		Plenur	-	
( Htg	0.0		0.0		Supply	18,00		18,000		lg Sqft/Ton	53.86	Retur		5 68
heat	-1,047.1		000 16.8	70.3	Mincfm		0	0	C.	lg Btuh/Sqft	222.81	Ret/O	A 89.	5 68
eat	0.0		0 0.0		Return	2,85	0	18,000	No	o. People	13	Runari	nd 75.	0 61
nidif	0.0		0 0.0	0.0	Exhaust	+	0	0	H.	tg % OA	0.0	Fn Mt	r <b>T</b> D <b>0</b> .	5 (
t Vent	0.0		0 0.0		Rm Exh	15,15	0	0		tg Cfm/SqFt		Fn 81		
tal	-21.3				Auxil	,		0		tg Btuh/SqFt		Fn Fr		

System 13 Block FC - FAN COIL

	Time ==>		Mo/Hr:					o/Hr:	•		Mo/Hr: 1		
utside A	ir ==>	0A	DB/WB/HR:	83/ 70/ 91.	0		* (	DADB:	83 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* 5	Space	Percnt *	Space (	Peak Coil	Peak	Per
	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot	* Sens	sible	Of Tot *	Space S	Sens Tot	Sens	0f
nvelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (8	Btuh)	(%) *	(B1	tuh) (B	tuh)	
Skylite	Solr	0	0		0	0.00	*	0	0.00 *		0	0	0
Skylite	Cond	0	0		0	0.00	*	0	0.00 *		0	0	0
Roof Co		108	0		108	20.93		108	28.50 *		-116	-116	99
Glass S		0	0		0			0	0.00 *		0	0	0
Glass C		0	0		0			0	0.00 *		0	0	0
Wall Co		0	0		0			0	0.00 *		0	0	0
Partiti		0	·		. 0			0	0.00 *		0	0	0
Exposed		0			0			0	0.00 *		0	0	0
Infiltr		0			0			0	0.00 *		Ö	0	0
Sub Tot		108	0		108	20.94		108	28.50 *		•	-116	100
ternal		100	•		170		*		*				
Lights		216	0		216	41.96	*	216	57.12 *		0	0	0
People		163	V		163	31.58		54	14.37 *		Ŏ	0	. 0
Misc		0	0	0	0			0	0.00 *		0	Ō	0
Sub Tota	al::>	379	0		379			271	71.50 *		0	0	0
iling L		0	0		0			0	0.00 *		0	0	0
tside A		0	0		0			0	0.00 *		0	0	0
p. Fan		•	•	•	28			•	0.00 *		•	0	0
t. Fan			0		0				0.00 *			ō	0
ct Heat			0		0				0.00 *			0	0
/UNDR S		0			0	0.00		0	0.00 *		0	0	0
haust H			0	0	0			٠	0.00 *		•	0	0
rminal			0	_	0	-0.00			0.00 *			Ô	0
	0)   000		•	•	•	0.00	*		*			-	•
and Tota	al==>	487	0	. 0	515	100.00	*	378	100.00 *	•	-116	-116	100
				ITNG COTE SE	:  FCTTON						AREAS-		
									OB/WB/HR			ss (sf	
				(cfm)						Floor	51		
n Clg	0.0	0.5	0.4	200	75.1 69	9.0 99.	8 73.2	68.	3 99.1	Part	0		
Clg	0.0	0.0	0.0	0		0.0		0.		ExFlr	0		
Vent	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.	0.0	Roof	51		0
als	0.0	0.5								Wall.	0		0
	HEATING	COIL SEL	ECTION		AIF	RFLOWS (c1	m)		-ENGINEERING	CHECKS	TEMPER	ATURES	(F)
	Capacity	Coil A		Lvg	Type	Cooling	Heating		lg % DA	0.0	Type	Clg	H
	(Mbh)	(cfi			Vent	Ō	0	-	lg Cfm/Sqft	3.92	SADB	73.3	
n Htg	-0.1		200 68.0		Infil	0	C		lg Cfm/Ton	4658.06	Plenum	75.0	
Htg	0.0		0 0.0		Supply	200	200		lg Sqft/Ton	1187.81	Return	75.0	
heat	-1.1		200 68.0		Mincfm	0	0		lg Btuh/Sqft		Ret/OA	75.0	
eat	0.0		0 0.0		Return	200	200		o. People	0	Runarnd	75.0	
idif	0.0		0 0.0		Exhaust	0	0		tg % OA	0.0	Fn MtrTD		
Vent	0.0		0 0.0		Rm Exh	0	Ċ		tg Cfm/SqFt	3.92	Fn BldTD		
								**	1 - 1.			•	

System	14	Block	RAD	-	RADIATION
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eaked at	t Time ==	>	Mo/Hr:	0/0			*	Mo	/Hr:	0/0 *		Mo/Hr: 1	3/1	
Outside A	Air ==>	OA	DB/W8/HR:	0/ 0/ 0.	0		*	. 0	AD8:	0 *		OAD8:		
		Space	Ret. Air	Ret. Air	į	let Pe	rent *	S	расе	Percnt *	Space Pe	ak Coil	Peak	Perci
	S	ens.+Lat.	Sensible	Latent	Tot	tal Of	Tot *	Sens	ible	Of Tot *		ens Tot	Sens	Of To
nvelope	Loads	(Btuh)	(Btuh)		(Bti	ıh)	(%) *	(B	tuh)	(%) *	(Btu	ih) (B	tuh)	(1
Skylite	e Solr	0	0			0 (	* 00.0		0	0.00 *		0	0	0.0
Skylite	e Cond	0	. 0			0 (	* 00.0	•	0	0.00 *		0	0	0.0
Roof Co	ond	0	0			0 (	* 00.0		0	0.00 *	-8,1	.87 <b>-8</b>	,187	2.0
Glass S	Solar	0	0			0 (	* 00.0		0	0.00 *		0	0	0.
Glass C	Cond	. 0	0			0 (	* 00.0		0	0.00 *	-23,2	48 -23	,248	7.
Wall Co	ond	0	0			0 (	* 00.0		0	0.00 *	-87,8	352 <b>-92</b>	,073	29.
Partiti	ion	0			-	0 (	* 00.0		0	0.00 *		0	0	0.
Exposed	Floor	0				0 (	* 00.0		. 0	0.00 *		0	0	0.
Infiltr		0				0 (	* 00.0		0	0.00 *	-185,2	74 -185	,274	60.
Sub Tot		0	0				* 00.0		0	0.00 *				100.
nternal							*			*				
Lights	-	0	0			0 (	* 00.0		0	0.00 *		0	0	0.
People		0					.00 *		0	0.00 *		0	0	0.
Misc		0	0	0			.00 *		0	0.00 *		0	0	0.
Sub Tot	al==>	0	0	0			* 00.0		0	0.00 *		0	Ō	0.
iling L		0	0	Ť			.00 *		0	0.00 *		17	0	0
tside A		0	0	0			1.00 *		0	0.00 *		0	0	0
ip. Fan		•	•	•			).00 *		•	0.00 *		•	0	0
t. Fan			0				.00 *			0.00 *			0	0.
ict Heat			0				).00 *			0.00 *			0	0
//UNDR S		0	•				.00 *		0	0.00 *		0	0	0
chaust H		-	0	0			* 00.0		·	0.00 *		-	0	0.
erminal			0	0			* 00.0			0.00 *			0	0.
71 111 111 111 111	0) pass		·	•			*			*			•	•
and Tot	al==>	0	0	. 0		0 0	* 00.0		0	0.00 *	-315,4	79 -308	,782	100.
			000	LING COIL S	ELECTION-							AREAS-		
			Sens Cap.								Gross Tot	al Gla	ss (sf	f) (a
			(Mbh)							Grains	Floor			, ,
in Cla			0.0		-						Part			
Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	3,164		0
als	0.0	0.0									₩all.	6,046	6	345
	HEATIN	G COIL SEL	ECTION	****	*	AIRFLOW	S (cfm)		{	ENGINEERING	CHECKS	TEMPER	ATURES	S (F)-
	Capacit	y Coil A	irfl Ent		Type	Cool		Heating		3 % OA	0.0	Type	Clg	
	(Mbh)	(cf	m) Deg F		Vent		Ö	0		cfm/Sqft	0.00	SADB	0.0	
n Htg	-308.		0 0.0	0.0	Infil		0	2,660		Cfm/Ton	0.00	Plenum	0.0	
Htg	0.		0.0	0.0	Supply		0	0		Sqft/Ton	0.00	Return	0.0	
heat	0.		0 0.0	0.0	Mincfm		0	Ō		Btuh/Sqft		Ret/OA	0.0	
eat	0.		0 0.0	0.0	Return		0	0	-	People	0	Runarnd	0.0	
idif	0.		0 0.0	0.0	Exhaust		0	0		% DA	0.0	Fn MtrTD		
Vent	0.		0 0.0	0.0	Rm Exh		Ö	0		cfm/SqFt		Fn BldTD		

BUILDING U-VALUES - ALTERMATIVE 1 BASE BUILDING

----- BUILDING U-VALUES

											•	
					Roo	m U-Val	ues				Room	Room
						/hr/sqf					Mass	Capac.
Room				Summr	Wintr	, , , ,	Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
2	RAD ONLY	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
Zone	2 Total/Ave.	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
3	ATTIC	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
4	OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0,563	0.280	0.000	55.0	15.45
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
5		0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
6	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
7	MECH ROOM	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
Zone	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
System	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000 0.317	68.1	15.93 16.91
8	LOBBY 8 Total/Ave.	0.000 0.000	0.000	0.000	0.000	0.000	0.550	0.563 0.563	0.343	0.317	66.3 66.3	16.91
Zone	<ul><li>8 Total/Ave.</li><li>8 Total/Ave.</li></ul>	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
System 9	PRIVATE DINING	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
System	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
10	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
System	10 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
11	BALL ROOM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
System	11 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
12	KITCHEN	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
Zone	<pre>12 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
System	<pre>12 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
13	KITCHEN OFFICE	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
Zone	<pre>13 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
System	13 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
	ATTIC	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
4		0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
	PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550 0.550	0.563 0. <b>5</b> 63	0.053	0.317 0.317	17.0	6.01
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.033	0.317	17.0 91.7	6.01 22.48
Zone	6 Total/Ave.		0.000	0.000	0.000	0.000	0.550	0.563		0.317	91.7	22.48
	LOBBY	0.000	0.000	0.000	0.000	0.000	0.550		0.343	0.317	66.3	16.91
0	20001	0.000	V. VVV	V. VVV	0.000	0.000	0.330	0.300	0.010	0.017	30.0	

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

BUILDING U-VALUES

					Roo	m U-Val	ues			~~~~	Room	Room
					(Btu	/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
9	PRIVATE DINING	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18:47
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
10	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53,3	14.05
System	14 Total/Ave.	0.000	0.000	0.000	0.000	0.040	0.550	0.563	0.267	0.317	52.0	13.93
Ruildin	•		0.000	0.000							48.2	12.57

BUILDING AREAS - ALTERNATIVE 1 BASE BUILDING

-----BUILDING AREAS-----

1		Bry G. A.			Floor	Total		Exposed						
			Munh	or of	Area/Dupl		Partition	Floor	Skylight	943	Net Roof	Window	Win	Net Wall
	Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
N	umber	Description	Flr		(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
	1	LIQUOR STORE	1	1	1,073	1,073	0	0	. 0	0	0	0	0	.0
7.		1 Total/Ave.		1	1,075	1,073	0	0	0	0	0	0	Ö	Ŏ
	ystem	1 Total/Ave.				1,073	0	0	0	Ö	ō	0	ō	0
		RAD ONLY		1	2,856	2,856	342	0	0	0	2,153	305	12	2,148
	one			_	-,	2,856	342	0	0	0	2,153	305	12	2,148
	ystem	2 Total/Ave.				2,856	342	0	0	0	2,153	305	12	2,148
	3	ATTIC	1	i	1,354	1,354	0	0	0	0	1,354	14	1	1,372
Z	one	3 Total/Ave.				1,354	0	0	0.	0	1,354	14	1	1,372
	ystem	3 Total/Ave.				1,354	Ō	0	0	0	1,354	14	1	1,372
	4	OFFICES		1	1,266	1,266	0	0	0	0	1,266	71	5	1,243
	one	4 Total/Ave.				1,266	0	. 0	0	0	1,266	71	5	1,243
	ystem	4 Total/Ave.			. 7.0	1,266	0	0	0	0	1,266	71	5	1,243
				1	1,748	1,748	0	0	0	0	0	153	36	267
	one	<ul><li>5 Total/Ave.</li><li>5 Total/Ave.</li></ul>				1,748	0	0	0	. 0	. 0	153 153	36 36	267 267
	ystem	LOUNGE		1	1,564	1,748 1,564	0	0	0	0	0	146	13	1,009
1	one	6 Total/Ave.		1	1,504	1,564	. 0	0	. 0	0	Ŏ	146	13	1,009
	ystem	6 Total/Ave.				1,564	. 0	0	0	0	0	146	13	1,009
		MECH ROOM		1	469	469	108	0	0	0	0	0	0	0
	one	7 Total/Ave.		_	,	469	108	0	0	0	0	0	0	0
	ystem	7 Total/Ave.				469	108	. 0	0	.0	0	0	0	. 0
		LOBBY	1	1	1,071	1,071	0	0	0	0	0	75	13	486
Z	one	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
	ystem	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
1	9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	72	13	478
	one	9 Total/Ave.				544	0	0	0	0	544	72	. 13	478
S	ystem	9 Total/Ave.				544	0	0	0	0	544	72	13	478
		DINING ROOM	1	1	1,537	•	0	0	. 0	0	0	114	17	546
_	one	10 Total/Ave.				1,537	0	· · · · · · · · · · · · · · · · · · ·	0	0	0	114	17 17	546
5)	ystem	10 Total/Ave.	1	1	4 227	1,537	. 0	0	0	0	0	114	_	546
7,		BALL ROOM 11 Total/Ave.	1	1	4,223	4,223 4,223	0	0	0	0	0	0	0	0
	one ystem	11 Total/Ave.				4,223	0	. 0	0	0	0	Ō	0	. 0
0)		KITCHEN	1	1	1,966	1,966	0	Ŏ	0	Ō	1,966	0	ō	495
7.0	one	12 Total/Ave.	-	-	1,700	1,966	Ö	0	0	0	1,966	ō	Ō	495
	ystem	12 Total/Ave.				1,966	0	0	0	0	1,966	0	0	495
		KITCHEN OFFICE	1	1	51	51	0	0	0	0	51	0	0	0
Z	one	13 Total/Ave.				51	Ō	0	0	0	51	. 0	0	0
Sy	ystem	13 Total/Ave.				51	0	- 0	0	Ō	51	0	0	0
	3	ATTIC	1	1	1,354	1,354	0	0	0	0	1,354	14	1	1,372
20	one	3 Total/Ave.				1,354	0	0	0	0	1,354	14	1	1,372
		OFFICES	1	1	1,266	1,266	0	0	0	0	1,266	71	5	1,243
Z	one	4 Total/Ave.			4 71.0	1,266	0	0	0	0	1,266	71	5	1,243
_		PARTY ROOMS	1	1	1,748	1,748	0	0	0	0	0	153	36	267
Z	one	5 Total/Ave.	4	1	1 6/4	1,748	0	. 0	0	0	0	153	36	267
7.		LOUNGE (A Total /Ava	1	1	1,564	1,564 1,564	0	0	0	0	0	146 146	13 13	1,009
20	one o	6 Total/Ave.	1	1	1,071	1,071	0	0	0	- 0	0	75	13	1,009 486
	ō	LUDDI	1	1	1,0/1	1,0/1	V	V	V	· V	V	13	10	400

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

-----BUILDING AREAS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Sk1 /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
Zone	8 Total/Ave.				1,071	0	0	0	0	. 0	75	13	486
9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	72	13	478
Zone	9 Total/Ave.				544	0	0	0	0	544	72	13	478
-10	DINING ROOM	1	1	1,537	1,537	0	0	0	0	0	114	17	546
Zone	10 Total/Ave.		_		1,537	0	0	0	0	0	114	17	546
System	14 Total/Avs.				9,084	0	0	0	0	3,164	645	11	5,401
Buildin	g				28,806	450	. 0	0	0	10,498	1,596	11	13,444

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.039 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.260 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.10 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 13.34 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	ų
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(\$)	
0 - 5	4.7	84	5,228	-141,200	30	1,122	2,357.8	29	2,555	0.0	0	0
5 - 10	9.4	3	171	-282,400	23	858	4,715.7	0	0	0.0	0	. 0
10 - 15	14.1	5	319	-423,600	28	1,019	7,073.5	0	0	0.0	0	. 0
15 - 20	18.8	4	239	-564,800	6	222	9,431.3	0	0	0.0	0	0
20 - 25	23.5	2	142	-706,000	13	481	11,789.2	0	0	0.0	0	0
25 - 30	28.2	2	106	-847,199	0	0	14,147.0	0	0	0.0	0	0
30 - 35	32.9	0	0	<b>-988</b> ,399	0	0	16,504.8	0	. 0	0.0	0	0
35 - 40	37.6	0	0	-1,129,599	0	0	18,862.6	0	0	0.0	0	0
40 - 45	42.3	. 0	0	-1,270,799	0	0	21,220.5	0	0	0.0	0	0
45 - 50	47.0	0	0	-1,411,999	0	0	23,578.3	0	0	0.0	0	0
50 - 55	51.7	0	0	-1,553,199	0	0	25,936.1	0	0	0.0	0	. 0
55 - 60	56.4	0	0	-1,694,399	0	0	28,294.0	0	0	0.0	0	0
60 - 65	61.1	0	0	-1,835,599	0	0	30,651.8	0	.0	0.0	0	0
65 - 70	65.8	0	0	-1,976,799	0	0	33,009.6	0	0	0.0	0	0
70 - 75	70.5	0	0	-2,117,999	0	0	35,367.5	0	0	0.0	0	0
75 - 80	75.3	0	0	-2,259,199	0	0	37,725.3	0	0	0.0	0	0
80 - 85	80.0	0	0	-2,400,399	0	0	40,083.1	0	C	0.0	0	0
85 - 90	84.7	0	0	-2,541,598	0	0	42,440.9	71	6,205	0.0	0	0
90 - 95	89.4	0	. 0	-2,682,799	0	0	44,798.8	0	0	0.0	0	0
95 - 100	94.1	0	0	-2,823,999	0	0	47,156.6	0	0	0.0	0	0
Hours Off	0.0	0	2,555	0	0	5,058	0.0	0	0	0.0	0	8,760

**BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 BASE BUILDING** 

					8 U I	LDI	N G	TEM	PER	ATU	RE P	ROF	ILE	\$					
Temperature										Zone N	umber ·								
Range (F)	1	2	3	4	5	6	7	В	9	10	11	12	13	3	4	. 5	6	8	9
Max. Temp.	35.0	92.3	78.8	78.8	79.9	79.2	71.2	79.4	78.5	79.5	79.9	96.7	80.0	103.3	103.4	161.7	103.3	111.9	115.3
Mo./Hr.	1 1	8 22	7 24	7 1	7 5	7 5	9 16	7 5	7 24	7 5	6 5	7 15	7 5	7 22	8 22	8 22	8 23	8 22	8 22
Day Type	1	1	1	2	1	1	4	1	1	1	2	1	1	1	1	1	1	1	1
									Nu	mber o	f Hours	s							
Above 100	0	0	0	0	0	0	0	0			0	0	0	245	590	4,196	1,086	2,544	2,640
95 - 100	0	0	0	0	0	0	0	0	.0	0	0	0	0		1,198		1,134	,	
90 - 95	0	868	0	0	0	0	0	0	0	0	0	138	0		1,026	85		87	48
85 - 90	0	1,276	0	0	0	0	0	0	0	0	0	778	0	770	283	163	36	338	196
80 - 85	0	784	0	0	0	0	0	0	0	0	0	1,174	. 0	630	498	812	465	611	315
75 - 80	0	131	2,439	3,113	3,672	3,020	0	3,672	2,657	3,317	2,801	820	4,107	0	72	520	683	337	597
70 - 75	0	766	866	559	0	652	1,563	0	1,011	406	658	213	4,653	0	102	1,167	219	211	102
65 - 70	0	4,393	3,839	3,944	3,362	3,024	3,387	1,289	3,563	3,863	443	889	0	3,769	3,950	1,652	4,080	3,950	3,923
60 - 65	0	542	844	936	1,360	1,464	3,810	895	1,441	1,141	695	847	0	696	828	30	349	298	651
55 - 60	0	0	536	208	366	600	0	581	88	33	782	576	0	446	208	0	0	0	0
50 - 55	0	0	236	0	0	0	0	1,239	0	0	872	620	0	177	0	0	0	0	0
Below 50	8,760	0	0	0	0	0	0	1,084	0	0	2,509	2,705	0	0	0	0	0	0	0
Min. Temp.	35.0	62.4	50.4	57.1	55.5	55.4	60.2	43.0	58.3	59.6	<b>3</b> 3.9	30.2	67.9	55.0	57.1	63.5	62.8	63.1	60.8
Mo./Hr.	1 1	2 6	2 6	2 6	2 11	2 9	3 20	2 10	2 6	2 8	2 10	2 8	1 6	1 5	2 6	1 6	2 6	2 6	2 6
Day Type	1	1	4	4	5	5	5	5	5	5	4	4	1	1	4	1	4	4	1

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

R	U	Ī	1	D	1	Ī	N	G	1	Ī	F	М	р	F	R	4	1	T I	H	R	Ε	р	R	0	F	Ţ	L	E	S

.. Number of Hours ......

Range (F)	10
Max. Temp.	114.7
Mo./Hr.	8 23
Day Type	1
Above 100 95 - 100 90 - 95 85 - 90 80 - 85 75 - 80 70 - 75 65 - 70 60 - 65 55 - 60 50 - 55 Below 50	2,910 18 297 515 476 200 855 3,253 236 0
Min. Temp.	63.4
Mo./Hr.	2 6
Day Type	4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION----

Month	ELEC Off Peak (k\h)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	HOT WTR On Peak (Therm)	STEAM DMND On Peak (Thrm/hr)	On Peak
Jan	56,442	112	106	1,433	0	5
Feb	50,966	112	96	1,453	0	5
March	53,970	115	106	844	0	5
April	48,332	124	102	274	0	5
May	46,342	139	0	0	0	0
June	51,504	149	0	0	0	0
July	61,924	157	0	0	0	0
Aug	<b>5</b> 3,759	150	0	0	0	0
Sept	45,451	143	0	0	0	0
Oct	49,089	116	79	133	0	4
Nov	49,879	131	102	455	0	5
Dec	55,712	112	106	1,165	0	5
Total	623,371	157	697	5,758	0	5

Building Energy Consumption = 96,268 (Btu/Sq Ft/Year)
Source Energy Consumption = 251,476 (Btu/Sq Ft/Year)

Floor Area =

28,806 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

EQUIPMENT ENERGY CONSUMPTION -----

														: :
	Equip Code	Jan	Feb	Mar	Apr	Mon May	thly Con June	sumption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS ELEC	15067	13609	15067	14581	15067	14581	15067	15067	14581	15067	14581	15067	177,399
	PK PK	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	MISC LD	7410	((04	7410	7177	7412	7173	7410	7410	7177	7412	7177	7410	07.0//
1	<b>PK</b> ELEC	7412 14.1	6694 14.1	7412 14.1	7173 14.1	14.1	14.1	7412 14.1	7412 14.1	7173 14.1	14.1	7173 14.1	7412 14.1	87,266 14.1
2	MISC LD	٨	•		^	^	•	•	۰					
	GAS PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD					•			٥				•	
	PK PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM PK	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20 PK	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD													
	P CHILL PK	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0.
1	EQ1161		AIR-	-CLD CONE	CGMP (1									
	ELEC PK	0.0	0.0	0 0.0	0.0	. 0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5200		COND	ENSER FA	ANS									
	ELEC PK	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0
1	EQ5303		CONT	ROLS							•			
	ELEC PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
2	EQ1100S		AIR-	·CLD RECI	IP 25-45	TONS			•					
	ELEC PK	0 0.0	0	0 20.2	229	1054 22.1	4777 26.2	9458 31.0	5245 26.6	1383 22.5	782 20.2	55 20.2	0 0.0	22,982 31.0
2	EQ5200			ENSER FA										÷
_	ELEC PK	0.0	0	0.1	9	72 0.9		713 2.7		94 1.6	34 0.7		0.0	1,626 2.7
2	EQ5001		CHIL	LED WATE	ER PUMP O	C.V.								

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

BAS	BUILDING													
	ELEC PK	0.0	0.0	0 3.0	268 3.0	832 3.0	1330 3.0	1572 3.0	1387 3.0	984 3.0	740 3.0	89 3.0	0.0	7,203 3.0
2	EQ5303		CONT	ROLS									,	
_	ELEC	0	0	0	27	84	134	158	139	99	74	9	0	724
	PΚ	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.3
3	£Q1281		TRAN	E HT-PMP	W-DEMAN	D DEFROS	RT							
·	ELEC	1076	974	1041	910	0	85	319	83	0	638	1038	1027	7,192
	PΚ	2.2	2.2	2.2	2.2	0.0	1.2	1.9	1.2	0.7	2.2	2.2	2.2	2.2
7	EQ5215		CUND	ENSER FA	NC									
	ELEC	0	0	0	0	- 0	13	47	13	0	0	0	0	73
	PK	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.1	0.0		0.0	0.3
7	EQ5308		CONT	מומ										
S	ELEC	59	CONT 53	53	51	. 0	18	37	19	0	. 42	. 51	56	438
	PK	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
-	PAC 10A		115 4 7	D1045 55	WAND DES	DOOT OVE	\ <del></del>							/
3	EQ5350 ELEC	14	12	PUMP DE	MANU DEF 0	RUST CYC	0	0	0	0	0	4	14	. 53
	PK	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6 0.0	0.0	0.0
4	EQ1281	4050		E HT-PMP					7.10					
	ELEC PK	1990 4.5	1779 4.5	2102 4.5	1123 4.5	0 0.5	279 2.4	810 3.6	342 2.5	23 1.9	794 4.5	1711 4.5	2018 4.5	12,970
	r.v.	4.3	4.3	۷. ۵	4.3	0.3	2.4	3.0	2.3	1.7	۷,5	4.3	4.3	4.5
4	EQ5215		COND	ENSER FA	NS									
	ELEC	0	0	0	0	0	42	121	52	4	0	0	0	219
	PK	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.4	0.3	0.1	0.0	0.0	0.5
4	EQ5308		CONT	ROLS										
	ELEC	56	53	53	40	0	24	50	30	10	24	51	53	443
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	.0.1
4	EQ5350		HEAT	PUMP DEI	MAND DEF	ROST CYC	LΕ							
	ELEC	28	25	14	0 .		0	0	0	0	0	12	28	108
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	EQ1101L		HR A	IR-CLD RE	ECIP >15	TONS								
·	ELEC	0	0	0	0	229	1279	3311	1357	201	0	0	0	6,378
÷	PK	0.0	0.0	0.0	0.0		23.2	24.0	23.3	22.5	0.0	0.0	0.0	24.0
5	EQ5200		CONDI	ENSER FAI	VS.									
·	ELEC	0	0		0	20	109	277	115	17	0	0	0	538
	PK	0.0	0.0	0.0	0.0	8.0	1.0	1.4	1.0	1.0	0.0	0.0	0.0	1.4
ξ	EQ5001		CHTEL	LED WATER	ם מאום כ	V								
J	ELEC	0	0		0	262	626	1110	728	254	0	0	0	2,980
	PK	0.0		0.0	0.0		3.0	3.0	3.0	3.0	0.0	0.0	0.0	3.0
	F0F707		AANTI	0010										,
5	EQ5303 ELEC	0	CONT!	KOF2	0	26	63	112	73	26	٨	۸	٨	700
	PK	0.0		0.0		0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	300 0.3
1	EQ4003			ENTRIF. F			-			<del>-</del>				•••
-														

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

OHO	E BUIEDING															
	ELEC PK	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>*</b> ₩	0.0	
3	EQ4003		FC	CENTRIF.	FAN C.V										tie in	
Ī	ELEC	650	587		629	650	629	650	650	629	650	629	650		7,649	
	PK	1.2	1.2		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2		1.2	
3	EQ4003		FC		FAN C.V.											
	ELEC	10	9		10	10	10	10	10	10	10	10	10		120	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
	EQ4003				FAN C.V.		•								÷.	
	ELEC	5	4	_	4	5	4	5	5	4	5	4	5		53	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	- 0.0	0.0	,	0.0	
4	EQ4003				FAN C.V.											A
	ELEC	944	853		914	944	914	944	944	914	. 944	914	944		11,114	
	PK	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8		1.8	
5	EQ4003				FAN C.V.											
	ELEC	0	. 0		142	112	154	189	164	120	174	92	0		1,182	
	PK	0.0	0.0	0.3	0.8	0.6	0.6	0.7	0.6	0.6	0.8	0.7	0.1		0.8	
6	EQ4003				FAN C.V.											
	ELEC	1346	1216	1346	1302	1346	1302	1346	1346	1302	1346	1302	1346		15,847	
	PK	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6		2.6	
6	EQ4003				FAN C.V.											
	ELEC	45	43	47	44	55	48	46	48	48	40	41	43		548	
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1	
6	EQ4003				FAN C.V.											
	ELEC	45	41	45	44	45	44	45	45	44	45	44	45		531	
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1	
8	EQ4003		FC	CENTRIF.	FAN C.V.									-		
	ELEC	447	403	447	432		432	447	447	432	447	432	447		5,258	
	PK	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8		0.8	
	EQ4003	•			FAN C.V.											
	ELEC	45	41		44	45	44	45	45	44	45	44	. 45		531	
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1	
10	EQ4003				FAN C.V.											
	ELEC	217	196		210	217	210	217	217	210	217	210	217		2,550	
	PK	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		0.4	
11	EQ4003				FAN C.V.				-				•			
	ELEC	5007	4523	5007	4846	5007	4846	5007	5007	4846	5007	4846	5007		58,957	
	PK	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5		9.5	-
12	EQ4003		FC	CENTRIF.	FAN C.V.											
	ELEC	11368	10268		11001	11363	11001	11368	11368	11001	11368	11001	11368		133,849	
	PK	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6		21.6	
12	EQ4003		FC	CENTRIF.	FAN C.V.											

Trane	Air	Condition	ning Eco	onomics	
Bv: Ti	rane	Customer	Direct	Service	Network

V 600 PAGE 30

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

	ELEC	1025	926	1025	992	1025	992	1025	1025	992	1025	992	1025	12,070
	PK	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
												•••	•••	• • •
13	EQ4003		FC C	ENTRIE	FAN C.V.									
10	ELEC	9	8	9	9	9	9	9	9	9	9	9	9	106
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	FN	0.0	V.V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500100		DHDC	HACED DI	TOT HOT	MATEO								
1	EQ2102	1 4 7 7			IST. HOT									
	P HOTH20	1433	1453	844	274	0	0	0	0	0	133	455	1165	5,758
	PK	5.3	5.3	5.3	4.8	0.0	0.0	0.0	0.0	0.0	3.6	5.0	5.3	5.3
	EQ5020				IRC. PUM									
	ELEC	504	455	504	172	0	0	0	0	0	116	236	504	2,490
	PK	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0
2	EQ2261		ELEC	TRIC RAD	IATION									
	ELEC	9055	8179	6502	3110	0	0	0	0	0	- 2020	4277	8355	41,499
	PK	17.2	17.2	17.2	17.2	0.0	0.0	0.0	0.0	0.0	17.2	17.2	17.2	17.2
3	EQ2101	•	PURC	HASED DI	STRICT S	TEAM								
	P STEAM	106	. 96	106	102	0	0	0	0	0	79	102	106	697
	PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4
		• • • •					• • • •	• • • •		• • •	• • •	• • •	• • •	0.1
3	EQ5020	•	HEAT	WATER C	IRC. PUM	P.C.V.								
_	ELEC	6	6	6	6	0	0	0	0	0	5	6	6	40
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	V. 0		V.V	0.0	0.0	٧,٧
3	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	12	11	12	12	0	0	0	0	0	9	12	12	82
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
	1 10	V.1	V.1	0.1	V.1	V. V	V , V	0.0	V. V	V. V	V . I	V.1	4.1	V.1

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1. BASE BUILDING

	ITTITT	асли	CHECKEHM	c

Utility	ELECTRIC	DEMAND
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 Peak Value
 157.3 (k#)

 Yearly Time of Peak
 17 (hr)
 7 (mo)

Hour 17 Month 7

11041 11	Homest 1			
Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
Cooling 8	Equipment			
2 3 4 5	EQ110(S EQ1281 - EQ1281 EQ1101L	AIR-CLD RECIP 25-45 TONS TRANE HT-PMP W-DEMAND DEFROST TRANE HT-PMP W-DEMAND DEFROST HR AIR-CLD RECIP >15 TONS	35.8 1.9 3.7 28.1	22.74 1.19 2.38 17.87
Sub Total	1		69.5	44.18
Sub Total	1		0.0	0.00
Air Movir	ng Equipment			
1 3 4 5 6 8 9 10 11 12 13 Sub Total		SUMMATION OF FAN ELECTRICAL DEMAND	0.0 1.3 1.8 0.6 2.7 0.8 0.1 0.4 9.5 23.5 0.0	0.00 0.80 1.14 0.41 1.74 0.54 0.05 0.26 6.04 14.95 0.01 25.94
			0.0	V.VV
Miscellan	neous			
Lights Base Uti Misc Equ Sub Total	uipment		33.0 0.0 14.1 47.0	20.94 0.00 8.94 29.88
Grand Tot	tal		157.3	100.00

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Trane Air Conditioning Economics

By: Trane Customer Direct Service Network
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 313

Time/Date Program was Run:

Dataset Name:

Weather File Code:	CARLIS	LE
Location:	ENERGY	SAVINGS OPPORTUNITY STUDY
Latitude:	40.2	(deg)
Longitude: -	- 77.2	(deg)
Time Zone:	5	
Elevation:	475	
Barometric Pressure:	29.2	(in. Hg)
0 01 11 1		
Summer Clearness Number:	1.00	
Winter Clearness Number:	1.00	
Summer Design Dry Bulb:		(F)
Summer Design Wat Bulb:	72	(F)
Winter Design Dry Bulb:	4	(F)
Summer Ground Relectance:	0.20	
Winter Ground Relectance:	0.20	
Air Density:	0.0742	(Lbm/cuft)
•		(8tu/lbm/F)
Density-Specific Heat Prod:		
Latent Heat Factor:		(Btu-min./hr/cuft)
	4.4519	
Enthalpy Factor:	4.4317	(ED-MIH./HI/CUIC!
Design Simulation Period: May	To :	September
System Simulation Period: Janu		
Cooling Load Methodology:		

18:27:35 2/ 1/94

CB313 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

		~~~~~~		Main			Auxil.	Room
		Outside	Cooling	Heating	Return	Exhaust	Supply	Exhaust
System	System	Airflow						
Number	Type	(Cfm)						
1	PTAC	0	0	0	0	0	0	0
2	RAD	0	0	0	0	957	0	0
3	SZ	450	1,600	1,600	2,141	991	0	200
4	SZ	235	2,325	2,325	2,837	747	0	0
. 5	VAV	892	892	0	1,056	1,056	0	0
6	SZ	1,600	3,315	3,315	3,765	2,050	0	1,000
7	SZ	5,220	5,220	5,220	5,220	5,220	0	5,220
8	SZ	110	1,100	1,100	1,319	329	0	0
9	SZ	360	1,000	1,000	1,215	574	0	. 0
10	SZ	780	2,400	2,400	2,657	1,037	0	0
11	SZ	5,040	11,100	11,100	11,100	5,040	0	0
12	SZ	14,400	18,000	18,000	18,193	14,593	0	15,150
. 13	FC	0	200	. 200	200	0	0	0
14	RAD	0	0	Û	0	2,358	0	0
Totals		29,087	47,152	46,260	49,703	34,952	0	.21,570

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

-- S Y S T E M S U M M A R Y ------(Design Capacity Quantities)

			Coo	1:					Baatiaa		,	
System Number	System Type	Capacity	Aux. Sys.	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)		Heating Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)		Heating Totals (Btuh)
1	PTAC	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
2	RAD	0.0			0.0	-90,812	0	0	0	0	0	-90,812
3	SZ	3.7	0.0	0.0	3.7	-46,846	0	-19,630	0	. 0	0	-46,846
1.4	SZ	3.2	0.0	0.0	3.2	-46,228	0	-8,086	0	0	0	-46,228
- 5	VAV	4.1	0.0	0.0	4.1	-17,826	0	-47,250	0	0	0	-65,076
6	SZ	5.4	0.0	0.0	5.4	-40,382	0	-111,002	0	0	Ö	-40,382
7	SZ	18.8	0.0	0.0	18.8	-280	0	-403,238	0	0	0	-280
8	SZ	1.6	0.0	0.0	1.6	-19,742	0	-2,048	0	0	0	-19,742
9	SZ	1.7	0.0	0.0	1.7	-20,417	0	-22,742	. 0	0	0	-20,417
10	SZ	3.1	0.0	0.0	3.1	-24,051	0	-\$5,065	0	. 0	0	-24,051
11	SZ	11.0	0.0	0.0	11.0	-1,208	0	-395,931	0	0	0	-1,208
12	SZ	36.5	0.0	0.0	36.5	-19,611	0	-1,047,061	0	0	0	-19,611
13	FC	0.0	0.0	0.0	0.0	-116	0	-1,117	0	0	0	-116
- 14	RAD	0.0	0.0	0.0	0.0	-215,486	0	0	0	0	0	-215,486
Totals		89.0	0.0	0.0	89.0	-543,003	0	-2,113,169	. 0	- 0	0	-590,253

The building peaked at hour 14 month 7 with a capacity of 89.0 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

a star e la			Percent		Cao	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq≠t	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	PTAC	0.00	0.00	1,088.5	******	0.00	0.00	0.00	1,073
2	Main	RAD	0.00	0.00.	0.0	0.0	0.00	0.00	-31.80	2,856
3	Main	SI	28.13	1.18	436.9	369.7	32.46	1.18	-34.60	1,354
. 4	Main	SZ	10.11	1.84	736.5	401.0	29.92	1.84	-36.51	1,266
5	Main	VAV	100.00	0.51	218.0	427.3	28.08	0.00	-37.23	1,748
6	Main	SZ	48.27	2.12	612.1	288.8	41.55	2.12	-25.82	1,564
7	Main	SZ	99. 99	11.13	278.3	25.0	479.87	11.13	-0.60	469
8	Main	SZ	10.00	1.03	683.5	665.5	18.03	1.03	-18.43	1,071
9	Main	SZ	36.00	1.84	578.1	314.5	38.16	1.84	-3 7.53	544
10	Main	SZ	32.50	1.56	780.9	500.1	23.99	1.56	-15.65	1,537
11	Main	SZ	45.41	2.63	1,012.0	385.0	31.17	2.63	-0.29	4,223
12	Main	SZ	. 80.00	9.16	493.1	53.9	222.81	9.16	-9.97	1,966
13	Main	FC	0.00	3.92	4,658.1	1,187.8	10.10	3.92	-2.28	51
14	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-23.72	9,084

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

eaked at utside A	t Time ==> Air ==>	0AI	Mo/Hr: DB/WB/HR:	91/ 73/ 98	.0		*	Mo/Hr: OADB:			Mo/Hr: 13 OADB:	•	
		Space	Ret. Ai	r Ret. Air	Ne	t Percnt	* .	Space	* Percnt *	Space Pe	eak Coil (Peak	Perc
	Ser	s.+Lat.	Sensibl		Tota	l Of Tot	* S	ensible	Of Tot *	Space Se	ens Tot	Sens	of T
nvelope		(8tuh)	(Btuh				*	(Btuh)	(%) *	(Bti	uh) (8	tuh)	(
Skylite	•	Ò	•	0	-	0.00	*	0	0.00 *		0	0	0.
Skylite		0		0		0.00	*	0	0.00 *		0	0	0.
Roof Co		0		0		0.00	*	0	0.00 *		0	0	0.
Glass S		0	1	0		0.00	*	0	0.00 *		0	0	. 0.
Glass (Cond	0		0		0.00	*	0	0.00 *		0 -	. 0	0.
Wall Co	ond	0		0		0.00	* .	0	0.00 *		0	- 0	0.
Partiti		0				0.00	*.	0	. 0.00 *		.0	0	0.
Exposed		0				0.00	*	. 0	0.00 *		0	0	0.
Infilt		0				0 97.45	*	0	100.00 *		0	0	104.
Sub Tot		0		0		0 97.45		0	100.00 *		0 .	0	104.
nternal							*		*				
Lights	****	0		0		0.00	*	0	0.00 *		0	0	0.
People		0				0.00		0	0.00 *	_	0	. 0	0.
Misc		0		0 0		0.00		. 0	0.00 *	_	0	0	0.
Sub Tot	tal==>	0		0 0	ı -	0.00		0	0.00 *		0	0	0.
iling L		0		0		0.00		0	0.00 *		0	Ō	0
tside A		0		0 0		0.00		0	0.00 *		0	0	0
p. Fan		•				0 2.55			0.00 *			0	-4
t. Fan			:	0		0.00			. 0.00 *			0	0
ict Heat				0	:	0.00		-	0.00 *			. 0	0.
//UNDR S		0		-		0.00		0	0.00 *		0 -	0	0.
chaust l				0 0		0.00			0.00 *			0	. 0.
erminal				0 0	ı	0.00			0.00 *			0	0
							*	۸	100.00 *		٥	۸	100
rand Tot	tal==>	0	1	0 0	!	0 100.00	*	0	100.00 *		0	0	100.
				OLING COIL							AREAS-		
	Total Ca			Coil Airf		ing DB/WB	•	-	DB/WB/HR	Gross To		ss (s	f) (s
	(Tons)	(Mbh)	(Mbh)	(cfm)	-	eg F Gra	_		F Grains	Floor	1,073		
n Clg	0.0	0.0	0.0	0				.9 24.		Part	0		
Clg	0.0	0.0	0.0	0	0.0			.0 0.		ExFlr	0		
Vent	0.0	0.0	0.0	0	0.0	0.0	0.0 0	.0 0.	0.0	Roof	0		0
als	0.0	0.0								Wall	. 0		0
	HEATING	COIL SEL	ECTION		A	IRFLOWS (cfm)		-ENGINEERING	CHECKS-+	TEMPER	ATURE	S (F)
	Capacity				Type	Cooling	Heati		lg % OA	0.0	Type	Clg	
	(Mbh)	(cfi	m) Deg	F Deg F	Vent	0		0 C	lg Cfm/Sqft		SADB	28.	0 38
n Htg	-0.0		0 38.		Infil	0			lg Cfm/Ton		Plenum	38 .	0 3
Htg	0.0		0 0.	0.0	Supply	0		Ō C	lg Sqft/Ton	*****	Return	38.	0 38
_	-0.0		0 38.	1 28.0	Mincfm	0		0 C	lg Btuh/Sqft	0.00	Ret/OA	38.	0 3
heat	0.0		0 0.	0.0	Return	0		0 N	o. People	0	Runarnd	38.	0 3
heat	V. V									Λ Λ	Co Minto	^	
heat leat			0 0.	0.0	Exhaust	0		0 H	tg % OA	0.0	Fn MtrTD	0.	V
eheat neat nidif : Vent	0.0		0 0.		Exhaust Rm Exh	0			tg Cfm/SqFt		Fn BldTD		

System 2 Block RAD - RADIATION

	t Time ==>		Hr: \mu/oM		٨			•	0/0 *		Mo/Hr: 13,		
Outside /	Alr ==>	UA	DB/WB/HR:	0/ 0/ 0.			* (ADB:	0 *		DADB:	ŧ	-
		Space	Ret. Air	Ret. Air	Net	Percnt	* 5	pace	Percnt *	Space Pea	ak Coil Pe	eak	Percni
•	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot		ible	Of Tot *	Space Ser	ns Tot Se	ens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (8	tuh)	(%) *	(Btul	h) (Bti	ıh)	(%)
Skylite	e Solr	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Skylite	e Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Roof Co	ond	0	0		0	0.00	*	0	0.00 *	-4,99	50 -4,9	950	5.45
Glass S	Solar	0	0		0	0.00	*	0	0.00 *		0	0	0.0
Glass (0	.0		0	0.00	*	0	0.00 *	-11,00)4 -11,0	04	12.1
Wall Co	ond	0	0		0	0.00	*	0	0.00 *	-7,34	15 -7,3	545	8.09
Partiti	ion	0			0	0.00	*	0	0.00 *	-88	35 -8	885	0.9
Exposed		0			0	0.00	*	0	0.00 *		0	0	0.0
Infiltr	ration	0			0	0.00	*	0	0.00 *	-66,62	28 -66,6	28	73.3
Sub Tot	tal==>	0	0		0	0.00	*	0	0.00 *	-90,81	2 -90,8	312	100.0
Internal	Loads						*		*				
Lights		0	. 0		0	0.00	*	0	0.00 *		0	0	0.0
People		0 ·			0	0.00		0	0.00 *		0	. 0	0.0
Misc		0	0	0	0	0.00		0	0.00 *		0'	0	0.0
Sub Tot	tal==>	0	0	0	0	0.00	*	0	0.00 *		0	0	0.0
eiling L		0	0		0	0.00		0	0.00 *		0	0	0.0
lutside A	Air	0	0	0	0	0.00		0	0.00 *		0	0	0.0
Sup. Fan					0	0.00			0.00 *			0	0.0
Ret. Fan			0		0	0.00			0.00 *			0	0.0
oct Heat	t Pkup		0		0	0.00			0.00 *			0	0.0
DV/UNDR S	Sizing	0			0	0.00		0	0.00 #		0	0	0.0
xhaust H			0	0	0	0.00			0.00 *			0	0.0
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
arand Tot	tal==>	. 0	0	. 0	0	0.00	•	0	0.00 *	-90,81	.2 -90,8	112	100.00
			CDQ1	ING COIL S	FLECTION						AREAS		
	Total C	apacity	Sens Cap.			g DB/WB/I	IR Lea	ving DE	3/WB/HR	Gross Tota		(sf)	(%)
	(Tons)	(Mbh)	(Mth)	(cfm)	Deg F Deg			Deg F	Grains	Floor	2,856	` ,	
in Clg	0.0	0.0	0.0	0	0.0 0	.0 0.	-	0.0	0.0	Part	342		
ıx Clg	0.0	0.0	0.0	0	. 0.0 0	.0 0	0.6	0.0	0.0	ExFlr	0		
t Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	2,153	(0 (
tals	0.0	0.0									2,453	30	5 12
	HEATING	COIL SEL	ECTION		AIR	FLOWS (ci	fm)	8	NGINEERING	CHECKS	TEMPERAT	URES	(F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clo	1 % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfi	m) Deg F	Deg F	Vent	0	0	Clg	Cfm/Sqft	0.00	SADB	0.0	68.
in Htg	-90.8		0.0	0.0	Infil	0	957	Clo	cfm/Ton	0.00	Plenum	0.0	
x Htg	0.0		0.0	0.0	Supply	0	0	Clo	Sqft/Ton	0.00	Return	0.0	68.
eheat	0.0		0.0	0.0	Mincfm	0	0		8tuh/Saft	0.00	Ret/OA	0.0	68.
heat	0.0	÷	0.0	0.0	Return	0	0	No.	People	0	Runarnd	0.0	68.
	0.0	-	0.0	0.0	Exhaust	0	0		% OA	0.0	Fn MtrTD	0.0	0.
midif													
umidif ot Vent	0.0		0.0	0.0	Rm Exh	0	0	Htg	Cfm/SqFt	0.00	Fn BldTD	0.0	0.0

System 3 Peak SZ - SINGLE ZONE

Peaked	at lime ==) nai	: TH\oM - GU\ AU\ A	7/14 91/ 74/105.			*	mo/ OA	Hr:	•		OADB	13/1	
UUTS1GE	AIT ==>	UAI	UB/WB/RK:	91/ /4/105.	U .		*	UH	נסט	07 * *		טעאט		
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sp	ace	Percnt *	Space Pe	ak Co	il Peak	Percn
	S	ens.+Lat.	Sensible		Total	Of Tot	*	Sensi		Of Tot *	-		t Sens	Of To
Envelop		(Btuh)		(Btuh)	(Btuh)	(%)		(Bt		(%) *	•		(Btuh)	(\$
		0	0		0				Ó	0.00 *			Ó	0.0
•	te Cond	0	0		0				0	0.00 *		0	0	0.0
Roof		3,507	0		3,507			4.	332		-3,5	92	-3,592	7.6
	Solar	408	0		408				310	1.42 *				0.0
Glass		101	0		101				104	0.47 *		07	-507	1.0
		2,526	0		2,526				710	12.40 *		00		10.8
Parti		0	-		0	0.00			0	. 0.00 *		0 .		0.0
	ed Floor	0			0	0.00			0	0.00 *		0	0	
		16,497			16,497				353			_	-37,646	
		23,040	0		23,040					72.35 *			-46,846	
	l Loads	20,010	·		20,010		*	101		*	-			
Light		4,429	0		4,429	10.08	*	5	365	24.55 *		0	0	0.0
People		700	·		700	1.59		,		3.10 *		Ô	, 0	0.0
Misc		0	0	0	0				0	0.00 *		0	0	0.0
	otal==>		0	-	5,129				042	27.65 *		0	0	0.0
	Load	0	0		0,117					0.00 *		0	. 0	0.0
_	Air	0	0		13,733				Ö	0.00 *		0	0	0.0
Sup. Fa		. •	v	v	2,048				٧	0.00 *		•	0	0.0
Ret. Fai		•	0		.0					0.00 *			0	0.0
	at Pkup		0		0.					0.00 *			0	0.0
DV/UNDR		0	V		0	0.00			0	0.00 *		0	- 0	0.0
Exhaust	-	V	0	0	0				v	0.00 *		•	0	0.0
	l Bypass		0	-	0					0.00 *			0	0.0
i Ci milia.	ι υγρασσ		v	V	V	2				*			•	٠.٠
Grand To	otal==>	28,170	0	. 0	43,951	100.00	*	21,	850	100.00 *	-46,8	46 -	-46,846	100.0
		·												
,											Gross Total			
					Deg F Deg								11433 (3	1) (1)
ain Cla					79.4 68									
ux Clg	0.0	0.0	0.0	1,600).0	0.0	0.0		ExFlr	0		
pt Vent		0.0	0.0	0				0.0	0.0		Roof			0
otals	and the second second	44.0	٧.٠	V	0.0	7.0	,.v		V.V	٧.٧	Wall .	1,386		14
Deals	3.7	44.V									Hall .	1,000		17
	HEATING	G COIL SELE	ECTION		AIF	RFLOWS (d	cfm)			ENGINEERING	CHECKS	TEM	PERATURE	s (F)
·. •	Capacit	y Coil Ai	irfl Ent	Lvg	Type	Cooling		Heating	01	g % OA	28.1	- Type	e Clg	Htg
	(Mbh)	(cfa	n) Deg F	Deg F	Vent	450		0	Cl ₂	g Cfm/Sqft	1.18	SAD8	62.	5 94.
ain Htg	-46.8	8 1,6	600 68.0	94.9	Infil	541	-	541		g Cfm/Ton		Plenum	75.	0 68.
ıx Htg	0.0	0	0.0	0.0	Supply	1,600		1,600	Cl	g Sqft/Ton	369.68	Return	75.	0 68.
eheat	-19.		600 50.0		Mincfm	. 0		0	Cl	g Btuh/Sqft	32.46	Ret/OA	79.	4 68
eheat	0.0		0.0		Return	1,600		1,600		. People	9	Runari	nd 75.	0 68
umidif	0.0		0 0.0		Exhaust	450		0		g % OA	0.0	Fn Mti	TD 0.	
pt Vent	0.0		0.0		Rm Exh	200		0		g Cfm/SqFt		Fn Blo		
otal	-46.1				Auxil	0		0		g Btuh/SqFt		Fn Fr		

4

System 4 Peak SI - SINGLE ZONE

eaked at	t Time ==>	nar	Mo/Hr: 7 8/W8/HR: 9	744 01/ 74/105 0			,	Hr: 7/ DB: 89	/17 * } *		Mo/Hr: 1. DADB:			
utside i	H11/	Uns	70/HU/III. /	/1/ /4/103.0	,		*		*	••	2,,,200			
		Space	Ret. Air	Ret. Air	Net	Percnt	* Sp	ace	Percnt *	Space Pea	ak Coil	Peak	Per	
	Sei	ns.+Lat.	Sensible	Latent	Total	Of Tot	* Sensi	ble	Of Tot *	Space Ser	ns Tot	Sens	0f	
nvelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (Bt	uh)	(%) *	(Btul	h) (B	tuh)		(%
Skylite		0	0		0		*		0.00 *		0		0	0.0
Skylite		0	0		0	0.00	*	0	0.00 *		0	0	0	0.0
Roof Co		3,258	0		3,258	8.60	* 3,	972	17.26 *	-3,3	58 -3	, 358	7	7.2
		3,056	0		3,056	8.07		417	10.50 *		0	0	0	0.1
Glass (504	0		504	1.33	*	512	2.23 *	-2,50	51 -2	,561	5	5.
Wall Co		2,165	0		2,165	5.71	* 2.	663	11.57 *	-4,6	18 -4	,618	9	9.
Partiti		0			0	0.00	*		- 0.00 *			.0		0.
	d Floor	0			0	0.00	*	0	0.00 *		0	0	0	٥.
Infilt		14,531			14,531			919	34.41 *	-35,69	91 -35	,691	77	1.:
Sub Tot		23,515	0		23,515			482	75.96 *	•		,228		0.
ternal		,	•		,		*		*					
Lights		4,025	0		4,025	10.62			21.29 *		0	0	C	0.
People		703	·		703	1.85			2.75 *		0	. 0	0	0.
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0	0.
	tal==>	_	0	0	4,727			533	24.04 *	~	0	0	C	0.
	Load	0	. 0	-	0	0.00			0.00 *		0	0	C	0.
tside A		0	0	0	6,664				0.00 *		0	0	C	0.
ip. Fan		•	•	·	2,976	7.86			0.00 *			0	C	0.
t. Fan		•	0		. 0	0.00			0.00 *			0	0	0.
ict Heat			0		0	0.00		•	0.00 *			0	· (٥.
//UNDR		0	v		0	0.00		0	0.00 *		0	0	(0.
chaust 1	_	•	0	0	0	0.00			0.00 *			0	(0.
	Bypass		0	0	0	0.00			0.00 *			0	(0.
HILIMI	0) pass		V	•			*		*					
and To	tal==>	28,243	0	. 0	37,883	100.00	* 23,	015	100.00 *	-46,2	28 -46	,228	100	0.
			0001	ING COIL SE	LECTION						AREAS-			
	Total C	apacity	Sens Cap.	Coil Airfl	Enterin	ig DB/WB/H	IR Leav	ing DB/	/WB/HR	Gross Tota	al Gla	ss (s	f) ((%
							ns Deg F							
in Clg	3.2	37.9	29.0	2,325	76.6 67	'. 6 89.			85.1	Part	0			
Clg	0.0	0.0	0.0	0			0.0	0.0	0.0	ExFlr	0			
t Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	1,266		0	
als	3.2	37.9								Wall.	1,314		71	
						erana (- t	- 1	•		CHECKO	TCHOCO	ATHOR	o (e'	١
							m)		YGINEERING		TEMPER			
		Coil A		_		Cooling	Heating	Clg	% OA	10.1	Type	Clg		Ht
	(Mbh)	(cfi		-	Vent	235	0		Cfm/Sqft		SAD8	65.		86
n Htg	-46.2			86.3	Infil	512	512		Cfm/Ton		Plenum	75.		68
Htg	0.0			0.0	Supply	2,325	2,325	_	Sqft/Ton	401.03	Return	75.		68
-	-8.1		325 61.5	64.7	Mincfm	0	0		Btuh/Sqft		Ret/OA	76.		68
	0.0			0.0	Return	2,325	2,325		People	8	Runarnd	75.		68
eheat	•				Fuhamak	235	0	Uta	% OA	0.0	Fn MtrTD	0.	3	(
eheat neat			0.0	0.0	Exhaust		V							
eheat heat midif t Vent			0 0.0		Rm Exh	0	0		Cfm/SqFt		Fn BldTD Fn Frict	0.	2	0

System 5 Block VAV - VARIABLE AIR VOLUME

	Time ==>	0.3	Mo/Hr:		٨	*	Mo/Hr: OADB:	•		10/Hr: 13/ 1	
tside A	1r ==>	UR	DB/WB/HR:	91/ /4/105.	U	, 1	י סעאט.	57	*	OADB: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt *	Space	Percnt	* Space Peak	Coil Peak	Perci
	Ser	s.+Lat.	Sensible		Total		•				Of To
velope I		(Btuh)	(Btuh)		(Btuh)	(%) *			•	(Btuh)	. (1
Skylite		0	Ò		Ó	0.00 *				0	0.0
Skylite		0	0		0	0.00 *				0	0.0
Roof Cor		0	0		0	0.00 *				0	. 0.0
Glass So		4,737	0		4,737	9.65 *				. 0	0.0
Glass Co	s .	1,101	0		1,101	2.24 *	•			-5,505	30.8
Wall Cor		207	24		231	0.47 *	•			-914	5.1
Partitio		0			. 0	0.00 *				. 0	0.0
Exposed		. 0			0	0.00 *					0.0
Infiltra		7,075			7,075					-11,408	
Sub Tota		13,120	24		13,144	26.78 *					100.
ternal l		10,120	4.7		10,111	*	•		*	27,020	
Lights	LOUIS	5,718	0		5,718	11.65 *	6,926	33.98	t 0	0	0.
People		904	. •		904	1.84 *				0	∠0.
Misc		0	0	0	0	0.00 *				0	0.
Sub Tota	al\	6,622	0	_	6,622	13.49 *				0	O.
iling Lo		3	-3	-	0,022	0.00 *				0	0.
tside Ai		0	0		28,391	57.84 *				0	0.
p. Fan I		V	v	V	935	1.90 *		0.00		0	0.
p. ran r t. Fan 1		-	0		.0	0.00 *		0.00		0	0.
ct Heat			. 0		0	0.00 *		0.00		0	0.
UNDR Si		0	v		0	0.00 *				0	0.
haust He	_	. •	-4	0	-4	-0.01 *		0.00		0	0.
rminal E			. 0	0	0	-0.00 *		0.00		0	0.
INITIGI	uypass		v	v	•	*		,	ľ	v	٠.
and Tota	al==>	19,746	17	. 0	49,088	100.00 *	20,386	100.00	-17,826	-17,826	100.
			000		71 PATTAU					40540	
	Total Ca		COD Sens Cap.			ng DB/₩8/HR	leaving		Gross Total	Glass (s	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg					748	1/ (10
n Cla	4.1	49.1	27.1	657	90.5 74		-	.7 56.9	Part	0	
n Clg	0.0	0.0	0.0	0		0.0		.0 0.0	ExFlr	0 '	
Clg Vent	0.0	0.0	0.0	0).0 0.0		.0 0.0	Roof	, v	0
als	4.1	49.1	v. v	V	0.0 0	7.0 0.0	V.V V	.0 0.0			153
•	HEATTNO	COT! CE!	CCTION		ΛΙΩ	ICI ONO (ofm	1		ב ראברעפ	TEMPERATURE	e (E)-
) Heating	Clg % OA			.s (r)- : Ht
	Capacity			-		Cooling 892		Clg Cfm/Sqft		SADB 54.	
. 114		(cf			Vent Infil		14	Clg Cfm/Sqrt	218.01 P	Plenum 75.	
n Htg	-17.8	٠.			Infil	164		Clg Cim/Ton	427.31 R	Return 75.	
Htg	0.0		0 0.0		Supply	892		-			
neat	-47.2		892 4.0		Mincfm	0		Clg Btuh/Sqfi		Ret/OA 90.	
	-0.0		0 0.0		Return	892		·		Runarnd 75.	
	^ ^		0 0.0	0.0	Exhaust	892	0	Htg % OA	0.0 F	n MtrTD 0.	
idif	0.0			Λ Λ		_		HE - AS IN FL	A AA . *	'- 01 JTA A	2 0
eat idif Vent al	0.0 0.0 -65.1		0 0.0	0.0	Rm Exh Auxil	0 0		Htg Cfm/SqFt Htg Btuh/SqF		n BldTD 0. n Frict 0 .	

System 6 Peak SZ - SINGLE ZONE

		t Time ==>		Mo/Hr:		٨			Hr: 7 DB: 8	•		Mo/Hr: 1		
	Outside A	A1r ==>	UH	DB/WB/HR:	91/ /4/105.	U		* UR	יסט: ס)y *		OAD8:	4	
			Space	Ret. Air	Ret. Air	Net	Percnt	* Sp	ace	Percnt *	Space Pe	eak Coil	Peak	Percnt
	•	Sei	ns.+Lat.	Sensible	Latent	Total	Of Tot	* Sensi	ble	Of Tot *	Space Se	ens Tot	Sens	Of Tot
	Envelope	Loads	(Btuh)	(Btuh)	(8tuh)	(Btuh)	(%)	* (Bt	uh)	(%) *	(Btu	ih) (E	3tuh)	. (\$)
	Skylite		0	0		0	0.00		0	0.00 *		0	0	0.00
	Skylite		0	0		0	0.00		0	0.00 *		0	0	0.00
	Roof Co		0	0		0	0.00		0	0.00 *		0	0	0.00
	Glass S		5,265	0		5,265	8.10		850	27.08 *		0	0	0.00
	Glass C		1,038	0		1,038	1.60	,	030 -	4.77 *		269 -5	,269	13.05
	Wall Co		920	97		1,017	1.57		984	4.55 *		85 -3	3,741	9.27
	Partiti		0			. 0	0.00		0	. 0.00 *		0	. 0	0.00
	Exposed	Floor	0			0	0.00	*	0	0.00 . *		0	0	0.00
	Infiltr	ation	10,478			10,478	16.12	¥ 6,	961	32.22 *	-31,3	72 -31	,372	77.69
	Sub Tot	al==>	17,701	97		17,798	27.39	* 14,	824	68.62 *	-40,0	25 -40	,382	100.00
	Internal	Loads						<i>*</i>		. *				
	Lights		4,900	0		4,900	7.54	* 5,	981	27.69 *		0	0	0.00
	People		861			861	1.32	*	782	3.62 *		0	0	0.00
	Misc		- , 0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
	Sub Tot	al==>	5,761	. 0	0	5,761	8.86	* 6,°	763	31.31 *		0	0	0.00
	Ceiling L	oad	14	-14		0	0.00	*	15	0.07 *	-	43	0	0.00
	Outside A	ir	0	. 0	0	37,218	57.27	*	0	0.00 *		0	0	0.00
	Sup. Fan	Heat				4,243	6.53	*		0.00 *			0	0.00
	Ret. Fan	Heat		0		. 0	0.00	*		0.00 *			0	0.00
	Duct Heat	Pkup		0		0	0.00	*	•	0.00 *			0	0.00
	OV/UNDR S	izing	G			0	-0.00	i.	0	-0.00 *		0	0	0.00
	Exhaust H	eat		-32	0	-32	-0.05	*		0.00 *			0	0.00
	Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
								*		*				
	Grand Tot	al==>	23,476	52	. 0	64,989	100.00	* 21,6	602	100.00 *	-40,0	68 -40	,382	100.00
				cool	THE COTE SE	TI FCTION						AREAS-		
		Total Ca		Sens Cap.			g D8/W8/H				Gross Tot			f) (%)
٠.		(Tons)	(Mbh)	(Mbh)	(cfm)		_				Floor	1,564	(5.	, (*)
	Main Clg	5.4	65.0	51.5	3,315		.3 100.	_	65.9	95.1	Part	0		
	Aux Clg	0.0	0.0	0.0	0		.0 0.		0.0	0.0	ExFlr	. 0		
	Opt Vent	0.0	0.0	0.0	0		.0 0.		0.0	0.0	Roof	0		0 0
	Totals	5.4	65.0					• • • • • • • • • • • • • • • • • • • •	• • •		Wall -	1,155	. 1	146 13
			COTI CELO	CTION		ATO	FLORG /~5	- 1			CHECKE	TENDEO	ATURCO	16)
		Capacity		CTION irfl Ent		Type						TEMPER		
	-	(Mbh)	(cfn		_		Cooling 1,600	Heating		% OA Cfm/Sqft		Type	Clg	_
	Main U+~	-40.4	3,3	-	79.1		450	0				SAD8	69.0	
	Main Htg		٥,٠			Supply		450		Cfm/Ton		Plenum	75.0	
	Aux Htg	0.0					3,315	3,315		Sqft/Ton	288.79	Return	75.0	
	Preheat	-111.0	3,3			Mincfm	0	0	_	Btuh/Sqft		Ret/OA	82.5	
	Reheat	0.0		0 0.0	0.0 0.0	Return Exhaust	2,765	3,315		People	10	Runarnd	75.0	
	U 2 42 E			41 [1	U.U	EXHAUST	1,050	0	HIG	% OA	0.0	Fn MtrTD	0.3	0.0
	Humidif	0.0						•						
	Humidif Opt Vent Total	0.0 0.0 -40.4		0 0.0	0.0	Rm Exh Auxil	1,000	0	Htg	Cfm/SqFt Btuh/SqFt	2.12	Fn BldTD Fn Frict	0.2	0.0

7 Peak

System

SZ - SINGLE ZONE

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* Mo/Hr: 7/15 * Mo/Hr: 13/1 Peaked at Time ==> Mo/Hr: 7/14 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 DADB: 91 * OAD8: 4 Space Ret. Air Ret. Air Net Percnt * Space Percnt * Space Peak Coil Peak Percnt (%) 0.00 0.00 * 0 0.00 * 0 ^^ 0 0 0 0 0 0 0 0 0 0 0 78 0 0.00 0

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 <t Roof Cond Glass Solar 0 0.00 * Glass Cond 0 Wall Cond Partition
Exposed Floor Partition 0 Infiltration 0 Sub Total==> 0.00 Lights 0 0.00 0.00 0.00 0 Ceiling Load 0.00 Outside Air 0.00 0 0.00 * 0.00 * 0.00 * 0.00 * 0.00 Sup. Fan Heat Ret. Fan Heat 0.00 0 · 0.00 0 · 0.00 0 Duct Heat Pkup OV/UNDR Sizing 0 0 0 0 0 0.00 Exhaust Heat Terminal Bypass **☼ ★** Grand Total==> 78 0 0 225,057 100.00 * 78 100.00 * -280 -280 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%)

(Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 469

Main Clg 18.8 225.1 88.1 5,220 90.5 74.3 105.0 75.0 62.7 67.5 Part 108 ExF1r 0 Roof 0 0 Wall 0 0 Aux Clg 0.0 0.0 0.0 0.0 Opt Vent 0.0 0.0 0.0 Totals 18.8 225.1 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 100.0 Type Clg Htg
 Capacity (Mbh)
 Coll Airfl
 Ent
 Lvg
 Type
 Cooling
 Heating
 Clg % OA
 100.0
 Type
 Clg
 Htg

 Main Htg
 -0.3
 5,220
 68.0
 68.0
 Infil
 0
 0
 Clg Cfm/Sqft
 11.13
 SADB
 75.0
 68.0

 Aux Htg
 0.0
 0
 0.0
 0.0
 Supply
 5,220
 Clg Cfm/Ton
 278.34
 Plenum
 75.0
 68.0

 Preheat
 -403.2
 5,220
 4.0
 75.0
 Mincfm
 0
 0
 Clg Sqft/Ton
 25.01
 Return
 75.0
 68.0

 Reheat
 0.0
 0
 0.0
 Return
 0
 5,220
 No. People
 0
 Runarnd
 75.0
 68.0

 Humidif
 0.0
 0
 0.0
 Exhaust
 0
 0
 Htg % 0A
 0.0
 Fn MtrTD
 0.0
 0.0

 Opt Vent
 0.0
 0
 0.0
 Rexh
 5,220
 0
 Htg Stuh/Sqft
 -0.60
 Fn Frict

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System 8 Peak SZ - SINGLE ZONE | Space | Ret. Air | Ret. Air | Net | Percht | Space | Space | Percht | P Space Ret. Air Ret. Air Net Percnt * Space Percnt * Space Peak Coil Peak Percnt . * Internal Loads 3,405 **0** 594 0 0.00 Lights 0 People 594 Misc 0 0 0.00 0 0 0.00 0 0 0.00 0 0 0.00 -38 0 0.00 0 0 0.00 Sub Total==> 3,999
Ceiling Load 13
Outside Air 0 Outside Air 1,408 7.29 * 0.00 * 0 0.00 Sup. Fan Heat 0 0 0.00 * 0.00 0 0.00 Ret. Fan Heat 0 0.00 0 0.00 Duct Heat Pkup OV/UNDR Sizing 0 0.00 Exhaust Heat Terminal Bypass 0.00 * Grand Total==> 14,668 41 0 19,311 100.00 * 12,706 100.00 * -19,607 -19,742 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 1,071
 Main Clg
 1.6
 19.3
 15.0
 1,100
 76.6
 67.5
 89.0
 63.2
 62.3
 84.8

 Aux Clg
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0

 Opt Vent
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 0.0
 Part 0 ExFlr 0 Roof 0 0 0 Wall 561 75 13 Totals 1.6 19.3 Capacity Coil Airfl Ent Lvg Type Cooling Heating U19 % UH 10.0 Type C19 11.03 SAD8 64.4 84.4 Main Htg -19.7 1,100 67.9 84.4 Infil 219 219 C19 Cfm/Ton 683.54 Plenum 75.0 67.9 Aux Htg 0.0 0 0.0 0.0 Supply 1,100 1,100 C19 Sqft/Ton 665.52 Return 75.0 67.9 Preheat -2.0 1,100 61.5 63.2 Mincfm 0 0 C19 Btuh/Sqft 18.03 Ret/OA 76.6 67.9 Reheat 0.0 0 0.0 0.0 Return 1,100 1,100 No. People 7 Runarnd 75.0 68.0 Humidif 0.0 0 0.0 0.0 Exhaust 110 0 Htg % OA 0.0 Fn MtrTD 0.3 0.0 Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 Htg Cfm/Sqft 1.03 Fn BldTD 0.2 0.0 Total -19.7 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 10.0 Type Clg Htg

System 9 Peak S2 - SINGLE ZONE

	t Time ==:	>	ho/Hr:	7/14			*	H\oM	r: 7	4		Mo/Hr: 13/	1	
Jutside	Air ==>	GA	06/38/HR:	91/ 74/105.	0		*	UAU	8: 8	39 *		OAD8: 4		
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Spa	ce	Percnt *	Space Pea	k Coil Pe	k	Percr
	Se	ens.+Lat.			Total			Sensib		Of Tot *	•			Of To
nvelope			(Btuh)		(Btuh)			(Btu		(%) *) (Btul		(!
		0			0			(000		0.00 *			0	0.0
-	e Cond	Ö	0		0					0.00 *) - 1-	-	0.0
Roof C		1,065	0		1,065			1,3			-1,23			6.
Glass		2,026	0		2,026			1,6		16.98 *				0.
Glass		514	0		514				14		-2,60			
Wall C		485	0		485			5		5.86 *		3 -1,6		
Partit		0	V		. 403			J		0.00 *				0.
	d Floor	0			0					0.00 *				• 0.
		5,408	0		5,408					33.80 *		9 -14,93 7 -20,43		
ouo io nternal		9,498	U		9,498	43.76		7,4	J	76.01 *		-20,4.	. /	100.
nternai Lights		1 750	۸		1 700			2.0	٥٨			١	ň	۸
-		1,729 311	0		1,729 311			2,0		21.22 *))	0	0.
		311	0	6				2		2.77 *		-	0	
Misc	+al>				2 040					0.00 *			0	0.
	tal==>	2,040	0		2,040					23.99 *)	0	0.
	Load	0	0		0					0.00 *)	0	0.
ıtside :		0	0	0	9,076				0	0.00 *)	0	0.
up. Fan			Δ		142	0.69				0.00 *			0	0.
et. Fan			0		0	0.00				0.00 *			0	0.
uct Hea		٨	0		0				^	0.00 *			0	0.
V/UNDR		0	٨	۸	0	-0.00			0	-0.00 *)	0	0.
xhaust			0	•	0					0.00 *			0	0.
erminai	Bypass		Û	0	0	0.00				0.00 *			0	0.
	h.1x	11 670					*			*			_	
and lo			0		20,757						-20,417	-20,41	7	100.
	· .		000	LING COIL SE	ELECTION							AREAS		
	Total C	apacity	Sens Cap.	Coil Airfl	Enterin	g D8/W8/	HR	Leavi	ng DB	/WB/HR	Gross Total	Glass	(sf)	(%
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	, F Grai	ns	Deg F De	eg F	Grains	Floor	544 .		
in Clg	1.7	20.8	15.8	1,000	80.6 70	.2 97	. 2	65.9	64.3	90.5	Part	0		
Clg	0.0	0.0	0.0	0.			.0		0.0	0.0	ExFlr	0		
Vent	0.0	0.0	0.0	0	0.0	.0 0	.0	0.0	0.0	0.0	Roof	544		0
als	1.7	20.8									Wall	550	7	2
	HEQTING	COTI SELS	ECTION	****	AIR	יבוטשפ (~	fm\-		5	NGINEERING	CHECKS	TEMPERATU	DEC	(s)_
	Capacity			Lvg		Cooling		eating		% OA	36.0		lg	(r)-
	(Mbh)	(cfa		Deg F	Vent	360	11	cating 0		Cfm/Sqft	1.84		6.0	- 86
n Htg	-20.4			86.8	Infil	214		214	_	Cfm/Ton	578.11		5.0	68
: Htg	0.0		0 0.0	0.0	Supply	1,000		1,000	_	Sqft/Ton	314.49		5.0	68
heat	-22.7			65.9	Mincfm	1,000		1,000		Btuh/Sqft				
				0.0				•	_				0.6	68
eat	0.0			0.0	Return	1,000		1,000		People * nA	4		5.0	68
idif	0.0				Exhaust	360		. 0		% 0A			0.0	(
t Vent	0.0		0 0.0	0.0	Rm Exh	0		0	_	Cfm/SqFt			0.0	0
al	-20.4				Auxil	0		0	n f H	Btuh/SqFt	-37.53	Fn Frict	0.1	(

System 10 Peak SZ - SINGLE ZONE

Peaked at	t Time ==>	,	Mo/Hr:	7/14		*	Mo/1	Hr: 7/1	17 *	TA3H ****** 	fo/Hr:_13/ 1	
Outside A	ir ==>	0A	DB/WB/HR: 1	91/ 74/105.0)	*		DB: 89	*		OADB: 4	
		Space	Ret Air	Ret. Air	Net.	Percnt *		ace	Percnt *		Coil Peak	Percn
	Ç ₀	ns.+Lat.	Sensible			Of Tot *			Of Tot *	•		Of To
Envelope		(Btuh)	(Btuh)		(Btuh)	(%) *			(%) *			(%
Skylite		0	(50011)		0	0.00 *		0	0.00 *		0	0.0
Skylite		0	0		0	0.00 *		0	0.00 *		0	0.0
Roof Co		0	0		0	0.00 *		0	0.00 *		. 0	0.0
Glass S		4,550	0		4,550	12.34 *		777	28.15 *		0	0.0
Glass C		807	0		807	2.19 *		820	4.83 *		-4,098	17.0
Wall Co		552	62		614	1.67 *		601	3.54 *			8.4
Partiti		0	-		0	0.00 *		0	0.00 *		_	0.0
	i Floor	0			0	0.00 *		0	0.00 *		0	0.0
Infiltr		6,080			6,080				23.43 *		-17,927	
Sub Tot		11,989	62		12,051		-	175	59.95 *			100.
nternal		11,707	01		12,001	*			. *		,,	
Lights	roans	4,886	0		4,886	13.25 *	6.4	020	35.46 *	0	0	0.
People		853	v		853	2.31 *			4.53 *		0	0.
Misc		0	0	0	0	0.00 *			0.00 *		0	0.
Sub Tot	tal::>	5, 739	0		5,739	15.56 *		788	39.99 *		0	0.
eiling l		10	-10	-	0	0.00 *	-	11	0.06 *		0	0.
itside A		0	0		18,423	49.96 *		0	0.00 *			0.
up. Fan		·		-	683				0.00 *		0	0.
et. Fan			0		0	0.00 *			0.00 *		0	0.
ict Heat			0		0	0.00 *			0.00 *		0	0.
//UNDR S		0			0	0.00 *		0	0.00 *	0	0	-0.
xhaust i			-17	0	-17	-0.05 *			0.00 *		0	0.
erminal			0		0	0.00 *			0.00 *		0	0.
	•					* *			*			
rand To	tal==>	17,738	35	0	36,879	100.00 *	16,	974	100.00 *	-23,879	-24,051	100.
			coo	LING COIL SE							AREAS	
	Total 0	Capacity	Sens Cap.							Gross Total		sf) (%
	(Tons)	(Mbh)	(Mbh)		Deg F Deg	g F Grains	Deg F	Deg F	Grains	Floor 1	,	
in Clg	3.1	36.9	29.5	2,400	80.1 70).2 98.3					0	
x Clg	0.0	0.0	0.0	. 0 -		0.0		0.0	0.0	Exflr	0	
t Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	0	0
tals	3.1	36.9		•						Wall	660	114
	HEATING	COIL SEL	ECTION		AI	RFLOWS (cfm)	EN	GINEERING	CHECKS	TEMPERATURE	S (F)-
	Capacity	/ Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clg	% OA	32.5	Type Clo	3 Ht
	(Mbh)	(cf		-	Vent	780	0	Clg	Cfm/Sqft	1.56	SADB 68.	.5 77
in Htg	-24.1		400 67.9		Infil	257	257	Clg	Cfm/Ton	780.93	Plenum 75.	
_	0.0		0 0.0	0.0	Supply	2,400	2,400	Clg	Sqft/Ton		Return 75.	.0 67
(Hta	-55.1		400 47.2		Mincfm	0	. 0	Clg	Btuh/Sqft	23.99	Ret/0A 80.	.1 67
-					Return	2,400	2,400	No	People	10	Runarnd 75.	.0 68
eheat	0.0)	0. 0.0	0.0	RECUIII	2,400	2,400	no.	Leobre	10	Bullul Hu FJ	
x Htg eheat heat midif	0.0 0.0		0. 0.0		Exhaust	780	. 0	Htg			Fn MtrTD 0.	
eheat	0.0 0.0 0.0)		0.0				Htg		0.0		.1 0

System 11 Peak SZ - SINGLE ZONE

Outside Air ==>	eak Pere	s 01) 0	0
Sens.Flat. Sensible Latent Total Of Tot # Sensible Of Tot # Space Sens Total Envelope Loads (8tuh)	ens Of uh) 0 0 0 0 0 0	s 01) 0	0
Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (\$\frac{1}{2})\$ # (Btuh) (\$\	uh) 0 0 0 0 0 0 0 0) 0	
Skylite Solr	0 0 0 0 0 0 0 0	Ó	
Skylite Cond	0 0 0 0 0 0 0 0		
Roof Cond	0 0	0	
Glass Solar	0 0		
Glass Cond		0 -	
Wall Cond	0 0	0	;
Partition		0	
Exposed Floor 0 0 0.00 * 0 0.0	0 0	0 .)
Infiltration 0 0 0.00	0 0	0)
Sub Total==>	0 0	0	ì
Lights 13,815 0	0 60)
Lights 13,815 0	0 60		
Lights 13,815 0 13,815 10.50 + 18,290 76.69 * 0 People 2,183		•	
People 2,183	0 0	0)
Misc 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0 0	0 0	0)
Sub Total==> 15,998	0 0	0)
Ceiling Load	0 0		
Outside Air O O 99,839 75.85 * O 0.00 * O Sup. Fan Heat 15,787 11.99 * 0.00 * 0.00 * Ret. Fan Heat 0 0 0.00 * 0.00 * 0.00 * Duct Heat Pkup 0 0 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0.00 0 0 0.00 * 0 0 0 0.00 0	0 0		
Sup. Fan Heat 15,787 11.99 0.00 * Ret. Fan Heat 0 0.00 * 0.00 * Duct Heat Pkup 0 0.00 * 0.00 * OV/UNDR Sizing 0 0.00 * 0.00 * Exhaust Heat 0 0 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 * Grand Total==> 15,998 0 0 131,624 100.00 * 23,851 100.00 * Coolling Coil Selection————————————————————————————————————	0 0	-	
Ret. Fan Heat 0 0 0.00 * 0.00	0 0		
Duct Heat Pkup 0 0 0.00 * 0.00 * 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 *	0 0	-	
OV/UNDR Sizing 0 0.00 * 0 0.00 * 0 Exhaust Heat 0 0 0 0.00 * 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 * 0.00 * 0.00 * Grand Total == > 15,998 0 0 131,624 100.00 * 23,851 100.00 * 0 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,223 Main Clg 11.0 131.6 115.8 11,100 82.0 71.6 102.7 71.7 68.4 101.9 Part 0 0 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 0 Dpt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0 0	0	ı
Exhaust Heat 0 0 0 0.00 * 0.00	0 39	0 :	
Terminal Bypass	0 0		
# Grand Total == > 15,998	0 0	-	
Grand Total ==> 15,998 0 0 131,624 100.00 * 23,851 100.00 * 0	•	•	
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,223 . Main Clg 11.0 131.6 115.8 11,100 82.0 71.6 102.7 71.7 68.4 101.9 Part 0 Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 Dpt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 0	0 100	0 10	1
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,223 . Main Clg 11.0 131.6 115.8 11,100 82.0 71.6 102.7 71.7 68.4 101.9 Part 0 Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 Dpt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 0			
(Tons) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,223 Main Clg 11.0 131.6 115.8 11,100 82.0 71.6 102.7 71.7 68.4 101.9 Part 0 Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 Opt Vent 0.0 0			
Main Clg 11.0 131.6 115.8 11,100 82.0 71.6 102.7 71.7 68.4 101.9 Part 0 Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 Opt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 0	(,	(-,	,
Aux Clg 0.0			
Opt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 0			
	0	0	0
	0		
	TURES (F)	RES (f	ES (
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 45.4 Type	Clg H		
(Mbh) (cfm) Deg F Deg F Vent 5,040 0 Clg Cfm/Sqft 2.63 SADB	73.0 -61	-	_
dain Htg -1.2 11,100 68.0 68.1 Infil 0 0 Clg Cfm/Ton 1011.97 Plenum	75.0 6		
Aux Htg 0.0 0 0.0 0.0 Supply 11,100 11,100 Clg Sqft/Ton 385.00 Return	75.0 6		
Preheat -395.9 11,100 38.9 71.7 Mincfm 0 0 Clg Btuh/Sqft 31.17 Ret/OA	82.0 6		
Reheat 0.0 0. 0.0 0.0 Return 11,100 11,100 No. People 28 Runarnd	75.0 6		
Humidif 0.0 0 0.0 Exhaust 5,040 - 0 Htg % DA 0.0 Fn MtrTD	0.3		
Dpt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 2.63 Fn BldTD	0.2		
Total -1.2 Auxil 0 O Htg Btuh/SqFt -0.29 Fn Frict	0.7		
Total 1.1 nov.1 0 V mty btum/byt b 0.27 in filet	V . 1	v.1	. 1

System 12 Peak SZ - SINGLE ZONE

Jystem												
					********						TING COIL PEAK	******
	Peaked at Time ==> Mo/Hr: 7/14 Outside Air ==> OADB/WB/HR: 91/ 74/105				*		Hr: 7,			Mo/Hr: 13/ 1		
Outside A	A1r ==>	UA	DB/WB/HK:	91/ /4/105.0)	*	UA	D8: 83	3 * *		OADB: 4	
		0	Data Ata	Data Aire	N = 4	A 4	0-				ale Onil Book	D
	•	Space		Ret. Air		Percnt *		ace	Percnt *	*		Percr
F 3		ens.+Lat.	Sensible		Total				Of Tot *			Of To
Envelope		(Btuh)	(Btuh)		(8tuh)	(%) *		uh)	(%) *			(5
Skylite		0	0		0	0.00 *		0	0.00 *			0.0
Skylite	e cona	7.016	0		7.01/	0.00 *		0	0.00 *		0 0	
Roof Co		3,816	0		3,816	0.87 *		109		-4,47		22. 0.
Glass S		0	0		0	0.00 *		0	0.00 * 0.00 *		0 0	0.
Glass (704	0		,	0.00 *		481	0.84 *		-	
Wall Co		384	V		384			0				0.
Partiti		0			0	0.00 *		-	0.00 *			
Exposed		0			0	0.00 *		0	0.00. *		•	
Infilt		0	^		0	0.00 *		0	0.00 *		45 -13,445	
Sub Tot		4,199	0		4,199	0.96 *		591			10 -19,610	100.
Internal		/ 7/1	Δ.		7.741			157	. *			٨
Lights		6,341	0		6,341	1.45 *		153	14.28 *		0 0	0.
People		1,049	75 (5)	7.040	1,049	0.24 *			3.56 *		0 0	0.
Misc		9,082	32,486		45,408	10.37 *			14.83 *		0 0	0. 0.
		16,472			52,798	12.05 *			32.66 *		0 0	
eiling t		0			0	0.00 *		0	0.00 *		0 0	0.
Outside A		0	0	0	311,339			0	0.00 *		0 0	0.
Sup. Fan			4		35,840	8.18 *			0.00 *		0	0.
let. Fan			0		0	0.00 *			0.00 *		0	0.
oct Heat		77 0/0	0		77.0/0	0.00 *		070	0.00 *		0	0.
V/UNDR S		33,869	^		33,869	7.73 * 0 .00 *		007	59.30 * 0.00 *		0 0	0.
Exhaust 1			0	0	0	0.00 *			0.00 *		0	0. 0.
[erminal	bypass		U	V	V	U.U∪ * *			V.00 ↑ *		V	٧.
Grand Tot	tal==>	54,540	32,486	3,840	438,045	100.00 *		111	100.00 *		-19,611	100.
			000		TI FOTTON						AREAS	
	Total	Capacity		LING COIL SE Coil Airfl		g DB/WB/HR			/WB/HR	Gross Tota		
	(Tons)	(Mbh)	(Mbh)						Grains		1,966	.,
in Clg	36.5	438.0	364.3	18,000	_	.8 103.6	70.3	67.4	99.0	Part	0	
x Clg	0.0	0.0	0.0	0 -		.0 0.0	0.0	0.0	0.0	ExFlr	0,	
t Vent	0.0	0.0	0.0	0		.0 0.0	0.0	0.0	0.0	Roof	1,966	0
tals	36.5	438.0								Wall	495	0
	HFATIN	G COIL SELE	ECTION		AIR	FLOWS (cfm)	EN	GINEERING	CHECKS	TEMPERATURE	S (F)-
	Capacit					Cooling	Heating		% OA	80.0	Type Cl	
	(Mbh)			_	Vent	14,400	0		Cfm/Sqft	9.16	SADB 72	-
in Htg	-19.			69.0	Infil	0	193		Cfm/Ton	493.10	Plenum 75	
x Htg	0.0		0 0.0		Supply	18,000	18,000	_	Sqft/Ton	53.86	Return 85	
_	-1,047.			70.3	Mincfm	0	0	_	Btuh/Sqft		Ret/OA 89	
eheat			0. 0.0		Return	2,850	18,000		People	13	Runarnd 75	
	0 . (U	V. V.U									
eheat	0.0					0	- 0					.5 0
reheat eheat umidif pt Vent	0.0 0.0 0.0	0		0.0	Exhaust Rm Exh			Htg	% DA Cfm/SqFt	0.0 9.16	Fn MtrTD 0 Fn 81dTD 0	

System 13 Block FC - FAN COIL

 Peaked at Time ==>
 Mo/Hr: 7/20
 * Mo/Hr: 7/20
 * Mo/Hr: 13/1

 Outside Air ==>
 OADB/WB/HR: 83/70/91.0
 * OADB: 83
 * OADB: 4

 | Space | Ret. Air | Ret. Air | Net | Percht | * | Space | Spa Net Percnt * Space Percnt * Space Peak Coil Peak Percnt Space Ret. Air Ret. Air 0 0.00 * 0 0.00 * 0 0.00 0 0 0.00
0 0.00 * 0 0.00 * 0 0 0.00
0 0.00 * 0 0.00 * 0 0 0.00
0 0.00 * 0 0.00 * 0 0 0.00
0 0.00 * 0 0.00 * 0 0 0.00
0 0.00 * 0 0.00 * 0 0 0.00
108 20.94 * 108 28.50 * -116 -116 100.00 0 Sub Total==> 108 . * Internal Loads 216 0 163 0.00 Lights 0 0.00 0 0.00 0 0.00 People 163 0 0.00 0 0.00 28 5.52 * 0.00 *
0 0.00 * 0.00 *
0 0.00 * 0.00 *
0 0.00 * 0.00 *
0 0.00 * 0.00 *
0 0 0 0 0.00 * 0.00 *
0 0 0 0 -0.00 * 0.00 * 0 0.00 Sup. Fan Heat 0 0 Ret. Fan Heat 0 0.00 0 0.00 0 0.00 Duct Heat Pkup OV/UNDR Sizing 0 Exhaust Heat Terminal Bypass 0 0.00 Grand Total==> 487 0 0 515 100.00 * 378 100.00 * -116 -116 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 51 . 0 Roof 51 0 0 Wall 0 0 0 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % 0A 0.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 3.92 SADB 73.3 68.5 Main Htg -0.1 200 68.0 68.5 Infil 0 0 Clg Cfm/Ton 4658.06 Plenum 75.0 68.0 Aux Htg 0.0 0 0.0 0.0 Supply 200 200 Clg Sqft/Ton 1187.81 Return 75.0 68.0 Preheat -1.1 200 68.0 73.1 Mincfm 0 0 Clg Btuh/Sqft 10.10 Ret/OA 75.0 68.0 Reheat 0.0 0 0.0 0.0 Return 200 200 No. People 0 Runarnd 75.0 68.0 Humidif 0.0 0 0.0 0.0 Exhaust 0 0 Htg % 0A 0.0 Fn MtrTD 0.0 0.0 Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Stuh/Sqft 3.92 Fn BldTD 0.0 0.0 Total -0.1 Auxil 0 Htg 8tuh/Sqft -2.28 Fn Frict 0.1 0.0

System 14 Block RAD - RADIATION

******	*******	*******	COOLING COIL	PEAK ****	******	******	****	*** CLG 5F	PACE PEAK ***	****** HE	ATING COIL	PEAK *	*****
	t Time ==		Mo/Hr:							*	Mo/Hr: 1		
Outside	Air ==>	0/	ADB/WB/HR:	0/ 0/ 0.	0		*	OADE	3: 0	*	OADB:		
							*			*			
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Spac	e Percnt	* Space P	eak Coil	Peak	Percnt
	S	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensibl	le Of Tot	* Space S	ens Tot	Sens	Of Tot
Envelope	Loads	(Btuh)	(8tuh)	(Btuh)	(Btuh)	(%)	*	(Btuh	1) (%)	* (Bt	uh) (8	tuh)	(%)
Skylit	e Solr	0	0		0	0.00	*		0.00		0	0	0.00
Skylit	e Cond	0	0	;	0	0.00	*		0.00		0	0	0.00
Roof C	ond	0	0	١	0	0.00	*				187 -8	.187	3.80
Glass	Solar	0	0	١	0	0.00	*		0.00			. 0	0.00
Glass	Cond	0	0	1	0	0.00	*		0.00		248 -23	.248	10.79
Wall C	ond	0	0	l	0	0.00	*		0.00		007 -19		9.20
Partit		0			0	0.00			0 0.00		0		0.00
	d Floor	0			0	0.00			0 0.00			0	0.00
	ration	0			0	0.00			0 0.00		220 -164	.220	
	tal==>	0	0		0	0.00			0 0.00		662 -215		
Internal							*			*		,	
Lights		0	0		0	0.00	*		0.00	*	0	0	0.00
People		. 0			0	0.00			0 0.00		0	. 0	0.00
•	_	. 0	0	0	0	0.00			0 0.00		0	0	0.00
	tal==>	0	0		0	0.00			0 0.00		0	0	0.00
Ceiling		0			0	0.00			0 0.00		-	0	0.00
Outside		0	0		0	0.00			0 0.00		0	0	0.00
Sup. Fan			·	•	0	0.00			0.00		•	0	0.00
Ret. Fan			0		0	0.00			0.00			Ö	0.00
Duct Hea			0		0	0.00			0.00			Ō	0.00
OV/UNDR		C	•		0	0.00			0 0.00		0	0	0.00
Exhaust		•	0	0	0	0.00			0.00		•	0	0.00
Terminal			0		0	0.00			0.00			0	0.00
	.,,		·	·	·					*		•	
Grand To	tal==>	0	0	0	0	0.00	*		0.00	* -223,6	050 -215	,486	100.00
			cnn	ING COTES	FIFCTION					*	AREAS-		
	Total	Capacity	Sens Cap.	Coil Airfl	Enterio	a DR/WR	/HR	Leavin	g D8/W8/HR	Gross To			
	(Tons)	(Mbh)	(Mbh)	(cfm)	Dea F Dea	F Grai	ins	Dea F De	g F Grains	Floor	9,084		, (•)
Main Clo									0.0 0.0		0		
Aux Clg	0.0	0.0	0.0	0.			0.0		0.0 0.0	ExFlr	0		•
Opt Vent	0.0	0.0	0.0	0).0		0.0 0.0	Roof	3,164		0 0
Totals	0.0	0.0				,	, , ,	•••	• • • • • • • • • • • • • • • • • • • •	Wall	6,046	6	45 11
	450118	C COTT SEL	ECTION	*****	AIR	FINNS (a	fm)		ENGINEERIN	CHECKS	TEMPERA	THOSE	(5)
	Capacit					Cooling	•	ating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	•			Vent	0	110	0	Clg Cfm/Sqft		SADB	0.0	_
Main Htg	-215.		0 0.0	0.0	Infil	0		2,358	Clg Cfm/Ton	0.00	Plenum	0.0	
Aux Htg	0.		0 0.0	0.0	Supply	0		0	Clg Sqft/Ton		Return	0.0	
Preheat	0.		0 0.0	0.0	Mincfm	0		Ŏ	Clg Btuh/Sqf		Ret/OA	0.0	
Reheat	0.		0. 0.0	0.0	Return	0		0	No. People	0.00	Runarnd	0.0	
Humidif	0.		0 0.0	0.0	Exhaust	0		0	Htg % OA	0.0	Fn MtrTD	0.0	
Opt Vent	0.		0 0.0	0.0	Rm Exh	0		Ŏ	Htg Cfm/SqFt		Fn BldTD	0.0	
Total	-215.		v v.v	7.0	Auxil	0		0	Htg Btuh/SqF		Fn Frict	0.0	0.0
iutal	711.	J			HWALL	V		V	neg beanyage	23.12	tu tiret	V.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

----- BUILDING U-VALUES-----

								******			Room	Room
						ı/hr/sqt					Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
- 2	RAD ONLY	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
Zone	2 Total/Ave.	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
System	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
3	ATTIC	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
Ione	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	. 23.3	8.65
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
. 4	OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
5	PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	.17.0	6.01
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
6	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
System	<pre>6 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
7		0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
Zone	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
System	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
. 8	LOBBY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
System 9	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
•		0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
Zone	9 Total/Ave.9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550 0.550	0.563 0.563	0.053	0.000	84.6	18.47 18.47
System 10	9 Total/Ave. DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	84.6 54.2	14.22
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
System	10 Jotal/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
11	BALL ROOM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
System	11 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
12	KITCHEN	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
System	12 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
13	KITCHEN OFFICE	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
Zone	13 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
System	13 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000-		0.000	22.2	5.22
3	ATTIC	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
4	OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
5	PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
6	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
8	LOBBY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

----- BUILDING U-VALUES-----

					Room	Room						
					(Btu	/hr/sqt	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
9	PRIVATE DINING	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
10	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
Zone	<pre>10 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
System	14 Total/Ave.	0.000	0.000	0.000	0.000	0.040	0.550	0.563	0.057	0.317	52.8	14.09
Buildin	g	0.144	0.000	0.000	0.000	0.039	0.550	0.563	0.057	0.317	48.7	12.67

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

					R U T	LDING	AREAS						
					5 0 1	202112	•				**************************************		
												() Agr	
									-				
				Floor	Total		Exposed					. 347	
		Numbe	r of	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Coom		Dupli		Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Room	Decemiation	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
Number	Description	LTI	NIII.	(sqir)	(341b)	(3416)	(5415)	(34.5)	(• /	(-1,-7	(-4,-7	3	
4	L TOHOO CTORE	1	1	1,073	1,073	0	0	0	0	0	0	0	0
	LIQUOR STORE	_	1	1,075	1,073	Ö	0	0	0	0	0	0	0
Zone	1 Total/Ave.				1,073	ő	0	0	0	. 0	0	0	0
System	1 Total/Ave.	1	1	2,856	2,856	342	0	0	.0	2,153	305	12	2,148
2	RAD ONLY	_	1	2,030	2,856	342	0	0	0	2,153	305	12	2,148
Zone	2 Total/Ave.				2,856	342	0	0	0	2,153	305	12	2,148
System	2 Total/Ave.		,	1,354	1,354	0	. 0	0	Ô	1,354	14	1	1,372
	ATTIC	1	1	1,334	1,354	0	0	. 0	0	1,354	14	1	1,372
Zone	3 Total/Ave.				1,354	0	0	0	0	1,354	14	1	1,372
System	3 Total/Ave.		1	1,266	1,266	0	0	0	0	1,266	71	5	1,243
	OFFICES	1	1	1,200	1,266	0	0	0	0	1,266	71	5	1,243
Zone	4 Total/Ave.				1,266	0	0	0	0	1,266	71	5	1,243
System	4 Total/Ave.		1	1 740	1,748	0	0	0	0	0	153	36	267
5	PARTY ROOMS	1	1	1,748	1,748	0	0	. 0	0	0	153	36	267
Zone	5 Total/Ave.				1,748	0	0	0	0	0	153	36	267
System	5 Total/Ave.			1 5/4		0	0	0	0	Ŏ	146	13	
	LOUNGE	1	1	1,564	1,564	0	0	. 0	0	0	146	13	1,009
Zone	6 Total/Ave.				1,564	0	0	0	0	0	146	13	1,009
System	6 Total/Ave.		,	4/0	1,564 469	108	0	0	0	0	0	0	0
	MECH ROOM	1	1	469	469	108	0	0	0	0	0	ō	0
Zone	7 Total/Ave.				469	108	0	0	0	0	0	Ō	. 0
System	7 Total/Ave.			1,071	1,071	0	0	0	0	0	75	13	486
	LOBBY	1	1	1,0/1	1,071	0	0	0	0	Ŏ	75	13	486
	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
System	8 Total/Ave.		1	544	544	0	0	0	Õ	544	72	13	478
9		1	1	- 344	544	0	0	. 0	0	544	72	13	478
Zone	9 Total/Ave.				544	0	0	0	0	544	72	13	478
System	9 Total/Ave.		,	1,537	1,537	. 0	0	0	Õ	- 0	114	17	546
	DINING ROOM	1	1	1,337	•	Ö	0	Ö	Ö	0	114	17	546
Zone	10 Total/Ave.				1,537 1,537	0	0	0	0	. 0	114	17	546
System	10 Total/Ave.		•	4 227	4,223	Ŏ	ŏ	0	0	0	0	0	0
. 11	BALL ROOM 11 Total/Ave.	1	1	4,223	4,223	0	0	0	0	0	0	0	0
Zone					4,223	0	. 0	0	0	0	0	0	. 0
System	11 Total/Ave.	1	1	1,966	1,966	ő	0	0	0	1,966	0	0	495
	KITCHEN 12 Total/Ave.		1	1,700	1,966	0	0	. 0	•	1,966	0	0	
Zone					1,966	0	0	. 0		1,966	0	0	
System	12 Total/Ave. KITCHEN OFFICE	. 1	1	51	51	0	0	0	· .	51	. 0	0	
	13 Total/Ave.	_	1	31	51	0	. 0	0	0	51	0	0	0
Zone					51	0	. 0	0	- 0	51	0	0	0
System	•	. 1	1	1,354	1,354	0	0	0		1,354	14		
	ATTIC	-	1	1,334	1,354	ň	Ö	0	•	1,354	14		1,372
Zone	3 Total/Ave.	. 1	1	1,266	1,266		0	-		. 1,266	71		
	OFFICES	_	1	1,200			0			1,266	71		
Zone	4 Total/Ave	1	1	1,748	1,266 1,748		0			0	153		•
	PARTY ROOMS		1	1,740	1,748		0			0	153		
Zone	5 Total/Ave	. 1	1	1,564	1,740		0			Õ	146		
	LOUNGE Total /Ava	_	1	1,304	1,564		0	-		Ŏ	146		
Zone	6 Total/Ave	· 1	1	1,071	1,071	-	0			0		1 3	
8	LOBBY	1	1	1,0/1	1,071		V		•				

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- BUILDING AREAS -----

Room			er of icate	Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	Win /Wl	Net Wall Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
Zone	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	72	13	478
Ione	9 Total/Ave.				544	0	0	0	0	544	72	13	478
10	DINING ROOM	1	1	1,537	1,537	0	0	0	0	0	114	17	546
Zone	<pre>10 Total/Ave.</pre>				1,537	0	0	0	0	0	114	17	546
System	14 Total/Ave.				9,084	0	0	0	0	3,164	645	11	5,401
Buildin	q				28.806	450	0	0	0	10.498	1.596	11	13.444

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.039 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.109 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.080 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.10 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 9.95 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

System Totals

Percent	Cool	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow		
Design	Cap.	Kours	Hours	Capacity		Hours	Cap.	Hours	Hours	Cap.	Hours	Hours	
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)		
0 - 5	4.5	86	5,335	-132,809	31	1,084	2,357.6	29	2,555	0.0	0	0	
5 - 10	8.9	2	109	-265,617	44	1,563	4,715.2	0	0	0.0	0	·· 0	
10 - 15	13.4	5	316	-398,426	12	419	7,072.8	0	0	0.0	0	0	
15 - 20	17.8	4	240	-531,234	14	487	9,430.4	0	0	0.0	0	0	
20 - 25	22.3	3	205	-664,043	0	0	11.788.0	0	0	0.0	0	0	
25 - 30	26.7	0	0	-796,852	0	0	14,145.6	0	0	0.0	0	0	
30 - 35	31.2	0	0	-929,660	0	0	16,503.2	0	- 0	0.0	0	0	
35 - 40	35.6	0	0	-1,062,469	0	0	18,860.8	0	0	0.0	0	0	
40 - 45	40.1	0	0	-1,195,278	0	0	21,218.4	0	0	0.0	0	0	
45 - 50	44.5	0	C	-1,328,086	0	0	23,576.0	0	0	0.0	0	0	
50 - 55	49.0	0	0	-1,460,895	0	0	25,933.7	0	0	0.0	0	0	
55 - 60	53.4	0	0	-1,593,704	0	0	28,291.3	0	0	0.0	0	0	
60 - 65	57.9	0	0	-1,726,512	0	0	30,648.9	0	0	0.0	0	0	
65 - 70	62.3	0	0	-1,859,321	0	0	33,006.5	0	0	0.0	0	0	
70 - 75	66.8	0	C	-1,992,130	0	0	35,364.1	0	0	0.0	0	0	
75 - 80	71.2	0	0	-2,124,938	0	0	37,721.7	0	. 0	0.0	0	0	
80 - 85	75.7	0	0	-2,257,747	0	0	40,079.3	0	0	0.0	0	0	
85 - 90	80.1	0	0	-2,390,556	0	0	42,436.9	71	6,205	0.0	0	0	
90 - 95	84.6	0	0	-2,523,364	0	0	44,794.5	0	0	0.0	0	0	
95 - 100	89.0	0	0	-2,656,172	0	0	47,152.1	0	0	0.0	0	0	
Hours Off	0.0	0	2,555	. 0	0	5,207	0.0	0	0	0.0	0	8,760	

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

					.			T F 14		A T !!				0						
					BOI	LUI	N G	TEM	PER	AIU	K E P	RUF	IFF	5			· * e			
•																				
Temperature										Zone N							~~~~			
Range (F)	i	2	3	. 4	5	6	7	8	9	10	11	12	13	3	4	5	6	8	9	
Max. Temp.	38.0	92.3	78.7	78.4	79.9	78.5	71.2	78.6	78.5	78.7	79.9	96.7	80.0	121.9	119.3	161.8	126.4	140.6	115.3	,
Mo./Hr.	1 1	8 22	7 24	7 24	7 4	7 5	9 16	7 4	7 4	7 4	6 5	7 15	7 5	8 22	8 22	8 22	9 22	9 22	8 22	-
Day Type	1	1	1	1	1	1	4	1	1	1	2	1	1	1	1	1	5			ŀ
- 7 71																				, i
									Nu	mber o	f Hour	s								
Above 100	. 0	0	0	0	0	0	0	0	0	0	. 0	0	0	2,944	2,892	4,271	2,815	3,457	2,640	٠
95 - 100	0	0	. 0	0	0	0	0	0	0	0	0	0	. 0	120	36	145	443	162	288	
90 - 95	0	868	0	Ō	0	0	0	0	0	0	0	138	0	124	131	32	224	229	48	
85 - 90	0	1,276	0	0	0	0	0	0	0	0	0	778	0	196	163	474	276	108	200	
80 - 85	0	784	0	0	0	0	0	0	0	0	0	1,174	. 0	288	386	846	198	700	379	
75 - 80	0	136	2,636	3,300	3,672	3,011	0	3,672	2,775	3,277	2,801	820	4,107	17	496	424	668	265	545	
70 - 75	0	829	1,027	372	. 0	661	1,563	0	897	480	658	213	4,653	197	147	1,222	297	931	111	
65 - 70	0	4,432	3,680	4,299	3,722	2,489	3,387	1,881	3,415	2,982	443	884	0	3,804	3,787	1,343	3,780	2,880	3,979	
60 - 65	0	,	1,083			1,005			1,553		695	852			722					
55 - 60	0	0	334	0	87	1,068	0	1,333	120	636	782	576	0	270	0	0	0	0	0	
50 - 55	0	0	0	0	0	526	0	903	0	0	872	615	0.	0	0	0	0	0	0	
Below 50	8,760	0	0	0	0	0	0	464	0	0	2,509	2,710	0	0	0	0	0	0	0	
Min Tomp	38.0	62.9	55.5	40.4	57 0	51 1	60.2	46.3	57.8	55.4	33.9	30.1	67.9	55.5	60.4	64.0	64.6	64.8	61.4	
Min. Temp.	30.0	02.7	22.2	2 4	2 11	21.1	3 20	2 8	21.0	2 10	2 10	20.1	1 4	22,2	7 4	1 4	7 4	2 6	2 6	
Mo./Hr.	1 1	2 6	2 6	2 0	2 11	2 10	3 ZV	2 8	20	2 10	2 10	4 0	1 0	4 0	4 0	1 0	Z 0	£ 0	۷ 0	
Day Type	1	1	1	1	5	5	5	5	5	2	4	4	1	1	1	1	1		1	

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

BUILDING TEMPERATURE PROFILES -----

..... Number of Hours

Range (F)	10
Max. Temp.	146.7
Mo./Hr.	9 22
Day Type	3
Above 100 95 - 100 90 - 95 85 - 90 80 - 85 75 - 80 70 - 75 65 - 70 60 - 65 55 - 60 50 - 55 Below 50	3,606 232 106 640 323 229 841 2,775 8 0
Min. Temp.	64.9
Mo./Hr.	2 6
Day Type	4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2

WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	HOT WTR On Peak (Therm)	STEAM DMND On Peak (Thrm/hr)	HOT W DMND On Peak (Thrm/hr)
Jan	53,808	108	97	918	0	4
Feb	48,572	107	88	966	0	4
March	52,736	118	97	515	0	4
April	47,724	120	94	164	0	3
May	46,335	139	0	0	0	0
June	50,555	147	0	. 0	0	0
July	60,524	154	0	0	0	0
Aug	52,763	147	0	0	0	0
Sept	45,350	143	C	0	0	0
Oct	48.930	121	73	45	0	2
Nov	48,857	121	94	258	0	3
Dec	53,668	107	97	691	0	4
Total	609,821	154	641	3,557	0	4

Building Energy Consumption = 86,826 (Btu/Sq Ft/Year) Source Energy Consumption . = 236,211 (Btu/Sq Ft/Year)

Floor Area =

28,806 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION-----

Dof	Equip				~ =	Mon	thly Cons	umntion			~~~~~~~	~~~~~	~~~~	
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS ELEC PK	15067 33.0	13609 33.0	15067 33.0	14581 33.0	15067 33.0	14581 33.0	15067 33.0	15067 33.0	14581 33.0	15067 33.0	14581 33.0	15067 33.0	177,399 33.0
i	MISC LD ELEC PX	7412 14.1	6694 14.1	7412 14.1	7173 14.1	7412 14.1	7173 14.1	7412 14.1	7412 14.1	7173 14.1	7412 14.1	7173 14.1	7412 14.1	87,266 14.1
2	MISC LD GAS PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
3	MISC LD DIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD P HOTH20 PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD P CHILL PK	0.0	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161 ELEC PK	0.0	AIR- 0 0.0	-CLD CONE 0 0.0	0.0 COMP <	15 TONS 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
. 1	EQ5200 ELEC PK	0.0	0	DENSER FA 0 0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ5303 ELEC PK	0.0	CON' 0 0.0	TROLS 0 0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ1100S ELEC PK	0.0	AIR- 0 0.0	-CLD RECT 0 20.2	250	TONS 977 22.0	3963 24.2	8347 28.3	4394 24.6	1294 22.2	909 20.2	53 20 .2	0.0	20,186 28.3
2	EQ5200 ELEC PK	0.0	0	DENSER FA	10	67 0.5	277 1.8	598 2.3	306 1.8	88 1.4	38 0.5	2	0.0	1,385 2.3
2	EQ5001		CHI	LLED WATE	R PUMP	C.V.								

Trane Air Conditioning Ecosomics V 600 By: Trane Customer Direct Service Natwork PAGE 59 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION 0 0 292 898 1306 1572 1375 984 892 ELEC Œ. 89 -0 7.409 0.0 0.6 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 ρĶ 3.0 0.0 3.0 2 EQ5303 CONTROLS 0 90 99 0 29 131 158 138 90 ELEC 0 9 0 745 ρĶ 0.0 0.0 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.0 0.3 3 EQ1281 TRANE HT-PMP W-DEMAND DEFROST ELEC 972 367 1030 826 87 315 85 0 594 995 989 6,759 PK 2.2 2.2 2.2 2.2 0.0 1.2 1.8 1.2 0.8 2.2 2.2 2.2 2.2 CONDENSER FANS 3 EQ5215 0 0 0 0 13 47 ELEC 0 13 0 0 0 0 73 0.0 PX 0.2 0.1 0.0 0.0 0.0 0.0 0.3 0.2 0.0 0.0 0.0 0.3 3 EQ5308 CONTROLS ELEC 53 48 53 51 0 18 39 21 0 41 51 53 427 0.1 PΚ 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 3 EQ5350 HEAT PUMP DEMAND DEFROST CYCLE ELEC 7 0 0 0 0 . 0 14 12 0 0 6 14 53 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 TRANE HT-PMP W-DEMAND DEFROST EQ1281 1727 1541 1830 924 Û 232 664 279 17 1315 ELEC 664 1756 10,948 2.1 PK 3.9 3.9 3.9 3.9 0.0 3.2 2.2 1.8 3.9 3.9 3.9 3.9 4 EQ5215 CONDENSER FARS 99 ELEC 0 0 0 0 0 35 42 3 0 0 0 179 PK 0.0 0.0 0.0 0.0 0.0 0.3 0.3 0.4 0.3 0.1 0.0 0.0 0.4 4 EQ5308 CONTROLS ELEC 53 48 53 32 0 23 46 27 7 23 43 53 406 PK 0.1 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 4 EQ5350 HEAT PUMP DEMAND DEFROST CYCLE ELEC 25 21 12 0 0 0 0 11 25 94 0 0 0 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 HR AIR-CLD RECIP >15 TONS 5 EQ1101L ELEC 0 0 0 0 201 0 0 229 1279 3311 1357 0 6,378 PΚ 0.0 0.0 0.0 0.0 0.0 22.4 22.5 0.0 0.0 23.2 24.0 23.3 24.0 5 EQ5200 CONDENSER FANS ELEC 0 0 0 0 20 109 277 115 17 0 0 0 538 PK 0.0 0.0 0.0 0.0 8.0 1.0 0.0 0.0 1.4 1.0 1.0 0.0 1.4 CHILLED WATER PUMP C.V. 5 EQ5001 0 0 0 0 0 ELEC 262 626 1110 728 254 0 0 2,980 PΚ 0.0 0.0 0.0 0.0 3.0 3.0 3.0 3.0 3.0 0.0 0.0 0.0 3.0

63

0.3

112

0.3

73

0.3

26

0.3

0

0.0

0

0.0

. 0

0.0

300

0.3

CONTROLS

0

FC CENTRIF. FAN C.V.

0.0

0

0.0

26

0.3

0

0.0

0

0.0

5 EQ5303

ELEC

PΚ

1 EQ4003

12 EQ4003

FC CENTRIF. FAN C.V.

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

₩ALL	& ROOF	INSULATION												
	ELEC	С	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	650	587	650	629	650	629	650	650	629	650	629	650	7,649
	PK	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	10	9	10	10	10	10	10	10	10	10	10	10	120
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	5	4	5	4	5	4	5	5	4	5	4	5	53
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	EQ4003		FC	CENTRIF.	FAN C.V.						-			
	ELEC	944	853	944	914	944	914	944	944	914	- 944	914	944	11,114
	PK	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
5	EQ4003				FAN C.V.									
	ELEC		. 0		154	119	158	191	168	126	182	105	6	1,255
	PΚ	0.1	0.0	0.4	0.8	0.6	0.6	0.8	0.6	0.6	0.8	0.7	0.2	0.8
6	EQ4003				FAN C.V.									
	ELEC	1346	1216		1302	1346	1302	1346	1346	1302	1346	1302	1346	15,847
	PK	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
6	EQ4003				FAN C.V.						**		,,	
	ELEC	43	41	45	42	52	45	44	45	45	39	40	41	522
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6	EQ4003		FC		FAN C.V.									
	ELEC	45	41	45	44	45	44	45	45	44	45	44	45	531
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8	EQ4003				FAN C.V.									
	ELEC	447	403			447	432	447	447	432	447	432	447	5,258
	PK	0.8	0.8	8.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
9	EQ4003				FAN C.V.									
	ELEC	45	41		44	45	44	45				44		531
	PX	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
10	EQ4003				FAN C.V.									
	ELEC	217	196	217	210	217	210	217			217			,
	PK	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11	EQ4003				FAN C.V.				•					_
	ELEC	5007	4523		4846	5007		5007	5007		5007	4846	5007	58,957
	PK	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
12	EQ4003				FAN C.V.									
	ELEC	11368							11368			11001		133,849
	PK	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6

V 600 Trane Air Conditioning Economics By: Trane Customer Direct Service Network PAGE 61 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION 1025 1025 ELEC 1025 926 992 992 1025 1025 992 1025 992 1025 12,070 1.9 1.9 1.9 PK 1.9 1.9 1.9 1.9 1.9 . 1.9 1.9 1.9 1.9 1.9 -FC CENTRIF. FAN C.V. 13 EQ4003 9 8 9 9 9 9 9 Q ς Q 9 9 ELEC 106 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 E02102 PURCHASED DIST. HOT WATER P HOTH20 918 515 164 0 Û 0 45 258 691 3,557 0 PΚ 3.7 3.7 3.7 3.3 0.0 0.0 0.0 0.0 0.0 1.9 2.7 3.6 3.7 1 EQ5020 HEAT WATER CIRC. PUMP C.V. ELEC 441 399 441 151 0 0 0 0 0 70 182 441 2,125 PK 0.8 0.8 0.8 0.8 0.0 0.0 0.0 0.0 0.0 0.8 0.8 0.8 0.8 2 EQ2261 **ELECTRIC RADIATION** ELEC 6866 6202 5605 2755 0 0 0 . 1781 0 0 3751 6677 33,637 PK 13.0 13.0 13.0 0.0 0.0 0.0 13.0 13.0 0.0 0.0 13.0 13.0 13.0 3 EQ2101 PURCHASED DISTRICT STEAM P STEAM 97 88 97 94 0 Û 0 0 0 73 94 97 641 PK 0.4 0.4 0.4 0.4 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.4 0.4 HEAT WATER CIRC. PUMP C.V. 3 EQ5020 6 0 0 0 5 ELEC 5 6 6 0 0 6 40 6 0.0 0.0 0.0 0.0 0.0 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

3 EQ5061

PK

ELEC

12

0.1

CONDENSATE RETURN PUMP

12

0.1

0

0.0

0

0.0

0

0.0

0

0.0

0

0.0

9

0.1

12

0.1

12

0.1

82

0.1

12

0.1

11

0.1

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

UTILITY PEAK CHECKSUMS	
Utility ELECTRIC DEMAND	
Peak Value 153.7 (kW) Yearly Time of Peak 17 (hr) 7 (mo)	

Hour 17	Month 7			
Eqp.			Utility	Percnt
Ref.	Equipment		Demand	
Num.	Code Name	Equipment Description	(kW)	(%)
Cooling	Equipment			
2	EQ1100S	AIR-CLD RECIP 25-45 TONS	32.7	21.29
3	EQ1281	TRANE HT-PMP W-DEMAND DEFROST	1.8	1.17
4	EQ1281	- TRANE HT-PMP W-DEMAND DEFROST	3.2	2.11
5	EQ1101L	HR AIR-CLD RECIP >15 TONS	28.1	18.29
Sub Tota	al		65.9	42.86
Sub Tota	al		0.0	0.00
Air Movi	ing Equipment			
1		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.00
3		SUMMATION OF FAN ELECTRICAL DEMAND	1.3	0.82
4		SUMMATION OF FAN ELECTRICAL DEMAND	1.8	1.17
5		SUMMATION OF FAM ELECTRICAL DEMAND	0.6	0.42
6		SUMMATION OF FAN ELECTRICAL DEMAND	2.7	1.78
8		SUMMATION OF FAN ELECTRICAL DEMAND	0.8	0.55
9 .		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.06
10 11		SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	0.4	0.27
12		SUMMATION OF FAN ELECTRICAL DEMAND	9.5	6.18 15.30
13		SUMMATION OF FAN ELECTRICAL DEMAND	23.5 0.0	0.01
Sub Tota	ıl		40.8	26.55
Sub Tota	1		0.0	0.00
Miscella	neous			
Lights			33.0	21.44
Base Ut	ilities		0.0	0.00
Misc Eq	uipment		14.1	9.15
Sub Tota	1		47.0	30.59
Grand To	tal		153.7	100.00

**************** **************** ** ** TRACE 600 ANALYSIS ** ** ** *************************** ************************

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 313

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft)

29.2 (in. Hg) Barometric Pressure:

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Eulo: 92 (F) Summer Design Wet Bult: 72 (F) Winter Design Dry Sulp: 4 (F) Summer Ground Relactance: 0.20 Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (8tu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 19:21:43 2/ 1/94

Dataset Name: CB313 .TM

AIRFLOW - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

(Design Airflow Quantities)

				Main			Auxil.	Room
		Outside	Cooling	Heating	Return	Exhaust	Supply	Exhaust
System	System	Airflow						
. Number	Type	(Cfm)	(Cfm)	(Cfm)	(Ofm)	(Cfm)	(Cfm)	(Cfm)
1	PTAC	0	0	0	0	0	. 0	0
2	RAD	0	0	Ć.	0	1,030	0	0
3	SZ	450	1,600	1,600	2,182	1,032	0	200
4	SZ	235	2,325	2,325	2,877	787	. 0	0
. 5	VAV	895	895	0	1,071	1,071	0	0
6	SZ	1,600	3.315	3,315	3.800	2,085	0	1,000
7	SZ	5,220	5,220	0.21	5.200	5,220	0 -	5,220
8	SZ	110	1,100	1,100	1,336	346	0	0
9	SZ	360	1,000	1,000	1,231	591	0	. 0
10	SZ	780	2,400	2,400	2.677	1,057	0	0
11	SZ	5,040	11,100	11.100	11,100	5,040	0	0
12	SZ	14,400	18,000	13,000	18,208	14,608	0	15,150
13	FC	0	200	200	200	0	0	0
14	RAD	0	0	0	0	2,539	0	0
Totals		29,090	47,155	45,260	49,902	35,406	0	.21,570

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

(Design Capacity Quantities)

			Coo	ling					Heating			
			Adx. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.		Reheat		Opt. Vent	Heating
System	•				Totals	Capacity	Capacity		Capacity	Capacity		Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(8tuh)	(átuh)	(Btuh)	(8tuh)	(Btuh)	(Btuh)	(8tuh)
1	PTAC	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
2	RAD	0.0	0.0	0.0	0.0	-95,937	0	0	0	0	0	-95,937
3	SZ	5.3	0.0	0.0	5.3	-67,262	0	-9,786	0	0	0	-67,262
4	SZ	4.5	0.0	0.0	4.5	-66,656	0	0	0	0	0	-66,656
- 5	VAV	4.2	0.0	0.0	4.2	-18,704	0	-47,261	0	0	0	-65,965
6	SI	6.3	0.0	0.0	6.3	-61,192	0	-106,125	0	0	Ò	-61,192
7	SZ	18.8	0.0	0.0	44.5	-133	Ō	-403,238	0	0	0	-280
8	SZ	2.1	0.0	0.0	2.1	-29,775	0	0	0	0	0	-29,775
9	SZ	1.7	0.0	0.0	1.7	-21.566	0	-22,463	. 0	0	0	-21,566
10	SZ	3.5	0.0	0.0	3.5	-35,394	0	-52,147	0	0	. 0	-35,394
11	SZ	11.0	0.0	0.0	11.0	-1,208	0	-395,931	0	0	0	-1,208
12	SZ	36.5	0.0	0.0	36.5	-20,645	0	-1,047,061	0	0	0	-20,645
13	FC	0.0	0.0	0.0	0.0	-116	0	-1,117	. 0	. 0	0	-116
14	RAD	0.0	0.0	0.0	0.0	-300,361	0	0	0	0	0	-300,361
Totals		93.7	0.0	0.0	93.7	-719,095	0	-2,085,127	. 0	0	0	-766,356

The building peaked at hour 14 month 7 with a capacity of 93.7 tons

ENGINEERING CHECKS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

-----ENGINEERING CHECKS -----

			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sa Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	PTAC	0.00	0.00	1,088.5	******	0.00	0.00	0.00	1,073
2	Main	RAD	0.00	0.00.	0.0	0.0	0.00	0.00	-33.59	2,856
3	Main	\$2	28.13	1.18	304.4	257.6	46.59	1.18	-49.68	1,354
4	Main	SZ	10.11	1.84	521.2	283.8	42.28	1.84	-52.65	1,266
5	Main	VAV	100.00	0.51	215.3	420.7	28.52	0.00	-37.74	1,748
6	Main	SZ	48.27	2.12	528.3	249.3	48.14	2.12	-39.13	1,564
7	Main	SZ	99.99	11.13	278.3	25.0	479.87	11.13	-0.60	469
8	Main	SZ	10.00	1.03	532.5	518.4	23.15	1.03	-27.80	1,071
9	Main	SZ	36.00	1.84	579.4	315.2	38.07	1.84	-39.64	544
10	Main	SZ	32.50	1.56	685.4	438.9	27.34	1.56	-23.03	1,537
11	Main	SZ	45.41	2.63	1,012.0	385.0	31.17	2.63	-0.29	4,223
12	Main	SI	. 80.00	9.16	493.1	53.9	222.81	9.16	-10.50	1,966
13	Main	FC	0.00	3.92	4,658.1	1,187.8	10.10	3.92	-2.28	51
14	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-33.06	9,084

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

Peaked a	t Time ==>		Mo/Hr:	7/15			*	Mo	/Hr:	7/15 *		Mo/Hr: 13	3/ 1	
Outside	Air ==>	0 A	DB/WB/HR:	91/ 73/ 98.	0		*	0	ADB:	91 *		CAD8:	4	*
		Space	Ret Air	Ret. Air	Ne	et Per	cnt *	S	pace	Percnt *		eak Coil F	Peak	Percnt
	Ser	s.+Lat.	Sensible		Tota		Tot *		•	Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh		(%) *		tuh)	(%) *			tuh)	(%)
	e Solr	0	(034.1)		-).00 *		0	0.00 *		0	0	0.00
-	e Cond	0	0				.00 *		0	0.00 *		0	0	0.00
Roof C		0	0				.00 *		0	0.00 *		0	0	0.00
Glass		0	0				.00 *		0	0.00 *		0	0	0.00
Glass		0	0				.00 *		0	0.00 *		0	0	0.00
Wall C		0	0				.00 *		0	0.00 *		0	0	0.00
Partit		0	•				.00 *		0	0.00 *		0	0	0.00
	d Floor	0			•		.00 *		0	0,00 *		0	0	0.00
	ration	į.					1.45 *		0	100.00 *		Û	0	104.25
	tal==>	0	0				.45 *		0	100.00 *		0	0	104.25
Internal		•	v			- "	*		•	*		*	-	
Lights		0	0			0 0	.00 *		0	0.00 *		0	0	0.00
People		0	v				.00 *		0	0.00 *		0	0	0.00
Misc		0	0	0			.00 *		0	0.00 *		0	0	0.00
	tal==>	0	0	-			.00 *		0	0.00 *		0	0	0.00
Ceiling		0	. 0	-			.00 *		0	0.00 *		0	0	0.00
Outside		0	0				.00 *		0	0.00 *		0	0	0.00
Sup. Fan			-	-			.55 *		-	0.00 *			0	-4.25
Ret. Fan			0				.00 *			0.00 *			0	0.00
Duct Hea			0				.00 *			0.00 *			0	0.00
OV/UNDR		Û					.00 *		0	0.00 *		0	0	0.00
Exhaust			0	0			.00 *			0.00 *			0	0.00
Terminal	Bypass		0	0			.00 *			0.00 *			0	0.00
							*			*				
Grand To	tal==>	0	0	. 0		0 100	.00 *		0	100.00 *		0	0	100.00
			coo	LING COIL SI	ELECTION							AREAS		
			Sens Cap.	Coil Airfl						8/W8/HR	Gross To	ial Glas	s (sf	(%)
				(cfm)						Grains		1,073		
ain Clg	0.0	0.0	0.0	0	38.1	30.7	15.4	27.9	24.9	15.2	Part	0		
ux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
otals	0.0	0.0						•			Wall .	0		0 0
			ECTION		A	IRFLOW	S (cfm)			ENGINEERING		TEMPERA	TURES	(F)
	Capacity				Type	Cool	ing	Heating		g % 0A	0.0	Type	Clg	Htg
	(Mbh)	(cfi			Vent		0	.0		g Cfm/Sqft	0.00	SAD8	28.0	
ain Htg	-0.0		0 38.1		Infil		0	0		g Cfm/Ton	1088.50	Plenum	38.0	
ux Htg	0.0		0.0		Supply		0	0		g Sqft/Ton	******	Return	38.0	
reheat	-0.0		0 38.1		Mincfm		0	0		g Btuh/Sqft	0.00	Ret/OA	38.0	
leheat	0.0		0 0.0		Return		0	0		. People	0	Runarnd	38.0	
lumidif	0.0		0 0.0		Exhaust		0	0		.g % OA	0.0	Fn MtrTD	0.0	
lpt Vent	0.0		0 0.0	0.0	Rm Exh		0	0		g Cfm/SqFt	0.00	Fn BldTD	0.0	
otal	0.0				Auxil		0	0	Ht	g Btuh/SqFt	0.00	Fn Frict	0.1	0.0

System 2 Block RAD - RADIATION

	t Time ==		Mo/Hr: (۸		*		Hr:			Mo/Hr:	•	
Uutside I	Air ==>	UA	D8/W8/HR:	0/ 0/ 0.	U		*	. UF	DB:	0 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	St	ace	Percnt *	Space Pea	ak Coi	l Peak	Percn
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensi	ble	Of Tot *	Space Ser	ns To	t Sens	Of To
Envelope		(Btuh)	(Btuh)	(8tuh)	(Btuh)	(%)	*	(Bt	uh)	(%) *	(Btul	n)	(Btuh)	(%
Skylite		0	0		0	0.00	*		0	0.00 *		0	0	0.0
Skylite		0	0		0	0.00	*		0	0.00 *		0	0	0.0
Roof Co		0	0		0	0.00	*		0	0.00 *	-4,95	50 .	-4,950	5.1
Glass S		0	0		0	0.00	*		0	0.00 *		0	0	0.0
Glass (0	0		0	0.00	*		0	0.00 *	-11,00)4 -	11,004	11.4
Wall Co		0	0		0	0.00	*		0	0.00 *	-7,34	45 ·	-7,345	7.6
Partiti		0			. 0	0.00			0	0.00 *			-885	0.9
	d Floor	0			0	0,00			0	0.00 4		0	0	0.
Infilt					2	2			÷	0.01 :		55 -	71,753	74.
Sub To		Ó	0		. 0	0.00			0	0.00 *			95,937	100.
internal		v	·		v		*		-	*			,	
Lights	_ = = = = =	0	0		0	0.00	*		0	0.00 *		0	0	0.
People		0	•		0	0.00			0	0.00 *		0	0	0.
Misc		0	0	0	0	0.00			0	0.00 *		0	0	0.
Sub Tot	tales	. 0	0	0	0	0.00			0	0.00 *		0	0	0.
eiling t		. 0	0	•	0	0.00			0	0.00 *		0	0	0.
utside A		٥	0	0	0	0.00			0	0.00 *		0	0	0.
up. Fan		V	•	•	0	0.00			•	0.00 *		•	0	o.
et. Fan		•	0		0	0.00				0.00 *			0	0.
uct Heat			0		0	0.00				0.00 *			0	0.
V/UNDR S		0	•		0	0.00			0	0.00 *		0 .	0	0.
xhaust h	-	. •	0	0	Ű	0.00			v	0.00 *		•	0	0.
erminal			0	0	0	0.00				0.00 *			0	0.
CIMILITAL	uypass		V	V	•	0.00	*			*			v	٠.
rand Tot	tal==>	0	0	. 0	0	0.00	*		0	0.00 *	-95,93	37 -9	95,937	100.
			coo:	THE COTE S	F! FCTION							ARFA!	5	
			Sens Cap.			ng D8/W8/				B/WB/HR	Gross Tota		lass (si	
	(Tons)	(Mbh)	(Mbh)	(cfm)					_	Grains	Floor	2,856	,	, .
in Cla			0.0	. ,	- ,			_	-		Part	342		
x Clg	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0		0		
-	0.0	0.0	0.0	0			.0	0.0	0.0	0.0		2,153		0
tals	0.0	0.0										2,453		305
	HEATIN	G COIL SEL	ECTION		AIF	RFLOWS (c	fm)-		{	NGINEERING	CHECKS	TEMPS	ERATURES	S (F)-
	Capacit	y Coil A	irfl Ent	Lvg	Type	Cooling	H	eating	Clo	% 0A	0.0	Type	Clg	Ht
	(Mbh)	(cf			Vent	Ō		0	Clg	Cfm/Sqft	0.00	SADB	0.0	
in Htg	-95.		0 0.0	0.0	Infil	0		1,030		Cfm/Ton	0.00	Plenum	0.0	
x Htg	0.0		0 0.0	0.0	Supply	0		0		Sqft/Ton	0.00	Return	0.0	
eheat	0.0		0.0	0.0	Mincfm			0		Btuh/Sqft		Ret/OA		
heat	0.0		0.0	0.0	Return	0		0		People	0	Runarno		
midif	0.0		0.0	0.0	Exhaust	0		0		, % OA	0.0	Fn Mtr		
t Vent	0.0		0.0	0.0	Rm Exh	0		0		Cfm/SqFt		Fn Bld		
I. VEIII.														

System 3 Peak SZ - SINGLE ZONE

Peaked a	t Time ==	>	Mo/Hr:	7/14			* Mo	/Hr:	7/17 *		Mo/Hr: 13/ 1	
Outside	Air ==>	OA	DB/WB/HR:	91/ 74/105.	0		* 0	AD8:	89 *		OADB: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pea	k Coil Peak	Percn
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot	* Sens	ible	Of Tot *	Space Sen	ns Tot Sens	Of To
Envelope	Loads	(8tuh)	(8tuh)	(Btuh)				tuh)	(%) *			(%
		0			0		*	0	0.00 *		0 0	0.00
		0	0		0		*	0	0.00 *		0 0	0.0
Roof C	ond	3,507	0		3,507	5.56	* 4	, 332	13.67 *	-3,59	72 -3,592	5.3
Glass	Solar	,			408	0.65	*	310	0.98 *		0 0	0.0
Glass	Cond	101	0		101	0.16	* '	104	0.33 *	-50	7 -507	0.75
Wall C	ond	11,593	0		11,593	18.38	* 11	,912	37.58 *	-22,62	-22,621	33.6
Partit					0		*	0	0.00 *		0 0	
	d Floor				0				0.00 *		0 0	0.0
		22,724			22,724				23.38 *		-40,542	60.2
	tal==>		0		38,335						52 -67,262	
Internal		,	·		,	*****		,	*		•	
Lights		4,429	0		4,429	7.02	* 5	.365	16.93 *		0 0	0.0
-		700	·		700			677	2.14 *		0 0	
Misc		0	0	0	0			0	0.00 *		0 0	0.0
	tal==>	5,129	_		5,129				19.06 *		0 0	
		0			0		*		0.00 *		0 0	
Outside		0			17,566		*	0	0.00 *		0 0	
Sup. Fan		•		_	2,048				0.00 *		0	0.0
Ret. Fan			0		0				0.00 *		0	0.0
Duct Hea			0		0				0.00 *		0	0.0
OV/UNDR		0	·		0			0	-0.00 *		0 . 0	
Exhaust	_	•	0	0	0				0.00 *		0	
Terminal			0		0				0.00 *		. 0	
	0,,,,,,,,		·	•	·		*		*			
Grand To	tal==>	43,464	0	. 0	63,079	100.00	* 31	,695	100.00 *	-67,26	-67,262	100.00
			000	LING COIL SE	ELECTION					~~~~~~~~~	AREAS	
										Gross Tota		sf) (%)
				(cfm)	Deg F De	g F Grain	s Deg F	Deg f	Grains	Floor		
lain Clg									62.1		0	
ux Clg	0.0	0.0	0.0	0		0.0 0.		0.0		ExFlr	0	
pt Vent	0.0	0.0	0.0	0		0.0 0.	0.0	0.0	0.0	Roof	1,354	0 (
otals	5.3	63.1								Wall	1,386	14
	HEATING	G COIL SEL	ECTION	~ ~ ~ ~ ~ ~ ~ ~ ~ ~	AI	RELOWS (cf	m)		-ENGINEERING	CHECKS	TEMPERATUR	ES (F)
	Capacity				Type	Cooling	Heating	_	lg % OA	28.1	Type Cl	
	(Mbh)				Vent	450	0		lg Cfm/Saft	1.18		.8 106.
ain Htg	-67.3			-	Infil	582	582		lg Cfm/Ton	304.38		.0 68.
ux Htg	0.0		0 0.0		Supply	1,600	1,600		lg Sqft/Ton			.0 68.
reheat	-9.8		600 50.0		Minofm	0	0		lg Btuh/Sqft		Ret/OA 79	
eheat	0.0		0 0.0		Return	1,600	1,600		. People	9		.0 68.
umidif	0.0		0 0.0		Exhaust	450	0		tg % OA	0.0		.3 0.
pt Vent	0.0		0 0.0		Rm Exh	200	Ŏ		tg Cfm/SqFt			.2 0.0

System 4 Peak SI - SINGLE ZONE

eaked at Ti	me ==>		Mo/Hr:	7/14			Mo/H				1,4,111	•	
utside Air	==>	040	09/W8/HR: '	91/ 74/105.	0	*	OAD	8: 89)		OADB:	4	
		Space	Pet. Air	Ret. Air	Net	Percnt *	Spa	ce	•		ak Coil F	eak	Percr
	Sen	s.+Lat.			Total						ns Tot S		Of To
nvelope Load	ds	(8tuh)		(Btuh)	(Btuh)	(%) *	(Btu				ih) (B1		(9
Skylite Sol		0	0		Ò		,		0.00 *			Ó	0.0
Skylite Cor		0			0	0.00 *		0	0.00 *		0	0	0.0
Roof Cond		3,258				6.09 *	3,9		11.70 *	-3,3	558 -3,	358	
Glass Solar	r	3.128	0		3,128			17	7.11 *		0	0	
Glass Cond		504	0		504	0.94 *		12	1.51 *	-2,5	61 -2,	561	3.
Wall Cond		11,116	0		11,116	20.77 *	12,9		38.14 *	-22,3	01 -22	301	33.
Partition		0			0				0.00 *		0	0	0.
Exposed Flo		0			0	0.00 *		0	0.00 *		0	0	0.
Infiltratio		19,511				36.45 *			25.09 *		36 -38,		
Sub Total=		-	0		37,517				83.55 *		56 -66		
ternal load		,	·		,	*			*		- 1		
Lights		4,025	0	•	4,025	7.52 *	4,9	58	14.59 *		0	0	0.
People		703	•		703	1.31 *	-		1.86 *		0	0	0.
Misc		0	0	0	0				0.00 *		0	0	0.
Sub Total==	=>		0	0	4,727				16.45 *		0	0	0.
iling Load		0	0		0				0.00 *		0	0	0.
tside Air		0	0	0	8,308				0.00 *		0	0	0.
p. Fan Heat		-	·	·	2,976				0.00 *			0	0.
t. Fan Heat			0			0.00 *			0.00 *			0	0.
ct Heat Pku			0		0			•	0.00 *			0	0.
/UNDR Sizir	-	0			0			0	-0.00 *		0	0	0.
haust Heat	_		0	0	0				0.00 *			0	0.
rminal Bypa			0	0	0	0.00 *			0.00 *			0	0.
						*			*				
and Total=	=> .	42,245	0	. 0	53,529	100.00 *	33,9	83	100.00 *	-66,6	56 -66,	656	100.
			000	ING COIL S	ELECTION		~~~~~~			*	AREAS		
					Enterin								
					Deg F Deg								
					76.6 65						-		
	0.0	0.0	0.0	0		0.0		0.0	0.0		0		
-	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	Roof	1,266		0
als	4.5	53.5								Wall	1,314		71
НЕ	EATING	COIL SELE	CTION	• • • • • • •	AIR	FLOWS (cfm)	EN	GINEERING	CHECKS	TEMPERA	TURES	(F)-
	pacity		irfl Ent			Cooling	Heating		% 0A	10.1	Type	Clg	
	(Mbh)	(cfr		Deg F	Vent	235	0		Cfm/Sqft	1.84	SADB	61.6	
•	-66.7	2,3		94.3	Infil	552	552		Cfm/Ton		Plenum	75.0	
(-,.	0 0.0	0.0	Supply	2,325	2,325		Sqft/Ton		Return	75.0	
n Htg	0.0			60.4	Minofa	0	0		Btuh/Sqft		Ret/OA	76.6	
n Htg Htg	0.0	2	325 61.5	00.4		V		_					-
n Htg Htg heat	-0.0	2,3				2.325	2.325	No.	People	8	Runarnd	75.0	68
n Htg Htg heat eat	-0.0 0.0	2,3	0.0	0.0	Return	2,325	2,325 0		People % OA	8 0.0	Runarnd Fn MtrID	75.0 0.3	
n Htg Htg heat eat idif	-0.0	2,3				2,325 235 0	2,325 0 0	Htg	People % OA Cfm/SqFt	0.0	Runarnd Fn MtrTD Fn 8ldTD	75.0 0.3 0.2	0

System 5 Block VAV - VARIABLE AIR VOLUME

Peaked a Outside	nt Time ==>		Mo/Hr: M	,	٨			/Hr: MADB:			Mo/Hr: OADB:	,	
0012108	HIL>	UHL	ojwojnk;	71/ /4/103.	U		*	HUD.	*		UHUO.	- 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pa	eak Coil	Peak	Percn
•	Se	ns.∔Lat.	Sensible	Latent	Total			ible	Of Tot *			Sens	Of To
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (B	(tuh)	(%) *	(Bti	uh) (Btuh)	(%
Skylit	e Solr	0	0		0	0.00	*	0	0.00 *		0	0	0.0
-	e Cond	0	0		0			0	0.00 *		0	0	0.0
Roof C		0	0		0	0.00	*	0	0.00 *		0	0	0.0
Glass		4,737	0		4,737			,710	42.32 *		0	0	0.0
Glass		1,101	0		1,101			,126	5.47 *	,		5,505	29.4
Wall C		207	24		231			210	1.02 *		318	-914	4.8
Partit	ion	0			. 0	0.00	*	0	0.00 *		0	0	0.0
	ed Floor	0			0			0	0.00 *		0	0	0.0
	ration	7,620			7,620	15.28		,726		•	285 -1	2,285	65.6
	tal::>	13,664	24		13,689	27.46	* 12	,771	62.05 *	-18,6	508 -1	8,704	100.0
Internal	Loads						*		*				
Lights		5,718	0		5,718	11.47		,926	33.66 *		0	0	0.0
People		904	•		904	1.81		874	4.25 *		0	0	0.0
Misc		0	0	0	Û	0.00	*	0	0.00 *		0	0	0.0
Sub To	tal==>	6,622	0	0	6,522	13.28	* 7	,800	37.90 *		0	0	0.0
Ceiling	Load	3	-3		0	0.00	‡	9	004 *	•	-95	0	0.0
Outside	Air	0	0	0	28,607	57.38	*	0	0.00 *		0	0	0.0
Sup. Fan	Heat				942	1.89	*		0.00 *			. 0	0.0
Ret. Fan	Heat		0		0	0.00	*		0.00 *			0	0.0
ouct Hea	t Pkup		0		0	0.00	*		0.00 *			0	0.0
V/UNDR	Sizing	0			0	0.00	*	0	0.00 *		0 .	O	0.0
xhaust	Heat		-4	0	-4	-0.01	*		0.00 *			0	0.0
Terminal	Bypass		0	0	0	-0.00	* *		0.00 *			0	0.0
Grand To	tal==>	20,290	17	. 0	49,856	100.00	* 20	,581	•		704 -1	8,704	100.0
			coot	THE COTE SE	FLECTION						^ D C ^ C		
			Sens Cap.			ng D8/W8/H			8/WB/HR	Gross Tot		ass (sf	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg			_	Grains	Floor	1,748	200 (0.	, (*,
ain Clg	4.2	49.9	27.4	662		1.3 105.	_		56.3	Part	0		
ıx Clg	0.0	0.0	0.0	0).0 0.		0.0		ExFlr	0		
pt Vent	0.0	0.0	0.0	0		0.0		0.0		Roof	0		0
	4.2	49.9						•••		Wall	420	1	153 3
	HEATING	COIL SELE	CTION		AIR	RFLOWS (cf	n)		ENGINEERING	CHECKS	TEMPE	RATURES	s (F)
	Capacity	Coil Ai	rfl Ent	Lvg	Type	Cooling	Heating	Cl	g % OA	100.0	Type	Clg	
	(Mbh)	(cfm) Deg F	Deg F	Vent	8 95			g Cfm/Sqft		SADB	53.9	
5 - U+ -	-18.7		0.0	0.0	Infil	176	176	Cl	g Cfm/Ton	215.31	Planum	75.0	67.
itu urd	0.0		0.0	0.0	Supply	895	0	Cl	g Sqft/Ton	420.74	Return	75.0	67.
		8	95 4.0	52.6	Mincfm	0	0		g Btuh/Saft	28.52	Ret/OA	90.5	
x Htg	-47.3			Λ Λ	Datum	895	0		. People	11	Runarnd		
x Htg eheat	-47.3		0.0	0.0	Return	073	V	טא	. reupic	11	Rullatillu	75.0	, 00
ıx Htg reheat eheat			0 0.0	0.0	Exhaust	895	0		g % OA	0.0	Fn MtrT		
ain Htg ux Htg reheat cheat umidif ot Vent	-0.0		0 0.0 0 0.0 0 0.0				_	Ht		0.0		D 0.3	3 0.

System 6 Paak SZ - SINGLE ZONE

eaked at	Time ==	>	Mo/Hr:	7/14			* Mo	o/Hr:	7/17 * 89 *	:	Mo/Hr: 13/	1
Dutside Ai	r ==>	0A	Mo/Hr: DB/W3/HR:	91/ 74/105.	0		‡ (• ')A08:	89 *	:	0AD8: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt *	Space Pea	k Coil Pea	k Perc
	S	ens.+Lat.	Sensible	Latent	Total			ible		Space Sen	s Tot Sen	s Of T
invelope L	pads	(Etuh)	(Btuh)	(8tuh)	(8tuh)	(%)	* (8	Stuh)	(%) *	(Btuh) (Btuh) (
Skylite S	Solr	0	0			0.00	, ·	0	0.00 *		0	o o.
Skylite (Cond	0	0		0	0.00		0	0.00 *		0	
Roof Cond	d	0	0 0 0			0.00			0.00 *		0	0 0.
Glass So	lar	5,265	0		5,265	6.99	5	850	21.45 *		0	0 0.
Glass Cor	nd	1,038	0		1,038	1.38	¢ 1	.030	3.78 *	-5,26	9 -5,26	9 8.
Wall Cond	d	5,136	537		5,672	7.53	k 6	.044	22.16 *	-20,04	1 -22,13	8 36.
Partition		0			0	0.00	·	0	0.00 *	,	0	
Exposed (0				0.00 *			0 0.
Infiltrat		12,429			12,429				27.49 *		5 -33,78	
			537		24,404	32 41	k 20		74.88 *		5 -61,19	
nternal Lo		20,007	301		-7,7∨9	02.41	k Lv	9747	*		. 01,17	_ 1001
Lights		4,972	0		4 970	6.60		1.921	21.93 *		0	0 0.
		861	v		361				2.87 *		0	0 0.
Misc		0	0	0		0.00			0.00 *		-	0 0.
		5,833			5.833				24.80 *		0	0 0.
						0.00		88	0.32 *	-25	-	0 0.
tside Air		75 0				54.44	· ·	۸	0.00 *		_	0 0.
ip. Fan He		V	V	V		5.64	· k	0	0.00 *		•	0 0.
-			0			0.00			0.00 *			0 0.
et. Fan He Ict Heat F					0	0.00	,		0.00 *		,	0 0.
//UNDR Siz		0	V			-0.00		0			0	0 0.
khaust Hea	-	. •	-179	0		-0.24		v	0.00 *			0 0.
erminal By					1/7	0.00	` .		0.00 *			0 0.
iminai by	hass		0	V	IJ	0.00			*		,	0.
and Total	::>	29,775	283	. 0	75.296			,271			8 -61,19	2 100.
			-	TWO COTE OF	TI COTTON						AREAS	
											l Glass	
									Grains		1,564	
in Clg	6.3	75.3	56.7	3.315	82.6 71	.0 98.4	66.3	64.6	91.4	Part	0	
Clg	0.0	0.0	0.0	0		.0 0.0		0.0		ExFlr	0	
t Vent	0.0	0.0	0.0	0	0.0 0	.0 0.0	0.0	0.0	0.0	Roof	0	0
als	6.3	75.3							,	Wall :	1,155	146
	HEATING	COIL SELE	ECTION	*****	AIR	FLOWS (cfn)		ENGINEERING	CHECKS	TEMPERATU	RES (F)-
C	apacity	Coil Ai	irfl Ent	Lvg	Type	Cooling	Heating	Cl	g % OA	48.3	Type C	lg Ht
	(Mbh)	(cfi	n) Deg F	Deg F	Vent	1,600	0	Cl	g Cfm/Sqft	2.12	SADB 6	7.4 84
n Htg	-61.2	3,3	67.5	84.5	Infil	485	485	€1	g Cfm/Ton	528.31	Plenum 7.	5.2 67
Htg	0.0)	0.0	0.0	Supply	3,315	3,315	Cl	g Sqft/Ton	249.26	Return 7	5.2 67
heat	-106.1	3,3	36.8		Mincfm	0	0		g Btuh/Sqft	48.14		2.6 67
eat	0.0	-	0.0		Return	2,800	3,315		. People	10		5.0 68
idif	0.0		0 0.0	0.0	Exhaust	1,085	0		g % OA	0.0		0.3 0
							-					
Vent	0.0)	0.0	0.0	Rm Exh	1,000	0	Ht	g Cfm/SqFt	2.12	Fn BldTD	0.2 0

System 7

Peak

SZ

- SINGLE ZONE

	******* Peaked at			OOLING COI Mo/Hr:	L PEAK ****	*******	******	**** *		SPACE /Hr:			ATING COIL Mo/Hr: 1		*****
	Outside A				91/ 74/105.	.0		*		AD8:			OADB:	•	
			Space	Ret. Ai	r Ret. Air	Ne	t Percnt	*	s	pace	* Percnt *	Space P	eak Coil	Peak	Percnt
		9	Sens.+Lat.	Sensible		Tota			Sens		Of Tot *	Space S	ens Tot	Sens	Of Tot
	Envelope		(Btuh)	(Btuh		(Btuh				tuh)	(%) *	(Bt	uh) (8	tuh)	(\$)
	Skylite		Ò	,	0		0.00			0	0.00 *		0	0	0.00
	Skylite		0		0		0.00			0	0.00 *		0	0	0.00
	Roof Co		0	(0		0.00			0	0.00 *		0	0	0.00
	Glass S		Ō		0		0.00			0	0.00 *		0	0	0.00
	Glass C		0	. (0		0.00			0	0.00 *		0	0	0.00
	Wall Co	ond	0		0		0.00	*		0	0.00 *		0	. 0	0.00
	Partiti		78			7	8 0.03	*		78	99.95 *		280	-280	99.98
	Exposed		0				0.00			0	0.00 *		0	0	0.00
	Infiltr		0				0.00			0	0.02 *		0	0	0.02
	Sub Tot		78		0	7.				78	99.97 *		280	-280	100.00
	Internal							*			*				
	Lights		0	1	0		0.00	*		0	0.00 *		0	. 0	0.00
	People		. 0				0.00			0	0.00 *		0	0	0.00
	Misc		. 0		0 0		0.00			0	0.00 *		0 -	0	0.00
	Sub Tot	al::>	0	4	0 0		0.00			0	0.00 *		0	0	0.00
	Ceiling L		0		0	1	0.00			0	0.00 *		0	0	0.00
	Outside A		0	4	0 0	224,97				0	0.00 *		0	0	0.00
	Sup. Fan						0.00				0.00 *			0	0.00
	Ret. Fan			(0		0.00				0.00 *			0	0.00
	Duct Heat				0		0.00				0.00 *			0	0.00
	OV/UNDR S	-	0				0.00			0	0.03 *		0	0	0.00
	Exhaust H	_		(0 0		0.00				0.00 *			0	0.00
	Terminal			(0 0	(0.00				0.00 *			0	0.00
					-			*			*				
	Grand Tot	al==>	78	(0 . 0	225,05	7 100.00	*		78	100.00 *	-7	280 -	-280	100.00
	••,					,									
				co	OLING COIL S	ELECTION							AREAS-		
		Total	Capacity	Sens Cap.	Coil Airfl	Enter	ing DB/WB,	/HR	Leav	ving DE	3/WB/HR	Gross To	tal Glas	s (sf)	(%)
٠.		(Tons)	(Mbh)	(Mbh)	(cfm)		eg F Gra		Deg F	Deg F	Grains	Floor	469		
	Main Clg	18.8	225.1	88.1	5.220	-	74.3 109		75.0	62.7	67.5	Part	108		
	Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
	Opt Vent	0.0	0.0	0.0	0	0.0		0.0	0.0	0.0	0.0	Roof	0		0 0
	Totals	18.8	225.1									Wall	0		0 0
		HEATIN	IG COIL SEL	ECTION		A	IRFLOWS (ofm)		[NGINEERING	CHECKS	TEMPERI	ATURES	(F)
		Capacit	y Coil A	irfl Ent	Lvg	Type	Cooling		Heating	Clg	3 % OA	100.0	Type	Clg	Htg
		(Mbh)	(cf	m) Deg 1	F Deg F	Vent	5,220		-0	Clg	g Cfm/Sqft	11.13	SADB	75.0	68.0
	Main Htg	-0.	.3 5,:	220 68.0	0 68.0	Infil	0		0	Clg	cfm/Ton	278.34	Plenum	75.0	68.0
	Aux Htg	0.	.0	0 0.0	0.0	Supply	5,220		5,220	Clg	sqft/Ton	25.01	Return	75.0	68.0
	Preheat	-403.	.2 5,	220 4.(0 75.0	Mincfm	0		0	Clq	g Btuh/Sqft	479.87	Ret/OA	90.5	68.0
	Reheat	0.	0	0 0.0	0.0	Return	0		5,220	No.	People	0	Runarnd	75.0	68.0
	Humidif	0.	.0	0 0.0	0.0	Exhaust	0		0	Htg	3 % OA	0.0	Fn MtrTD	0.0	0.0
	Opt Vent	0.	.0	0 0.0	0.0	Rm Exh	5,220		0		g Cfm/SqFt	11.13	Fn BldTD	0.0	0.0
	Total	-0.	3			Auxil	0		0	Ht	g Btuh/SqFt	-0.60	Fn Frict	0.0	0.0
														•	1.5

System 8 Peak SZ - SINGLE ZONE

000100 111	r ==>	DAD	B/WB/HR:	91/ 74/105.0				AD8:	89 *		OAD8: 4	
		Space	Ret Air	Ret. Air	Net.	Percnt	* * S	pace	* Percnt *	Space Peak	Coil Peak	Percn
	Se	ns.+Lat.	Sensible			Of Tot		ible		•		Of To
nvelope Lo		(Btuh)			(8tuh)			tuh)		(Btuh)		(%
Skylite S		0	0		0			Ó	0.00 *			0.0
Skylite (0	0		0			0	0.00 *		0	0.0
Roof Con		0	0		0			0	0.00 *		0	0.0
		3,300	-		3,300			,400	15.58 *	0		0.0
Glass Co		532	0	ı	532			536	3.48 *	-2,702	-2,702	9.0
Wall Con			349		3,666		* 4	,055	26.32 *		-10,663	
Partitio		0	•		- 0		*	0	0.00 *	0	0	0.0
Exposed		0			0		*	0	0.00 *			0.0
Infiltra		8,122			8,122			,641			-16,410	
Sub Tota			349)	15,619			,632	69.01 *		-29,775	
nternal L		13,270	01)		10,017	00.00		, , , ,	*		,	
Lights		3,405	Ċ	1	3,405	13.73	* 4	,145			0	0.0
People		594	v		594			536	3.48 *		_	0.
Misc		2,4	0	0	0			0	0.00 *		0	0.
	1>	3,999	0		3,999			.681	30.38 *		_	0.
			-77		0,777			94	0.61 *			0.
utside Ai		7 7			3,792			0	0.00 *		_	0.
		U	V	•	1,408			•	0.00 *		0	0.
up. Fan H			(i	1,400				0.00 *		0	0.
et. Fan H			(0				0.00 *		0	0.
uct Heat		0		,	0			0	0.00 #		0	0.
V/UNDR Si	-	9	-27	0	-27			•	0.00 *		0	0.
xhaust He			(2)		0				0.00 *		0	0.
erminal B	ypass			, ,	V	V.00	*		*		·	••
rand Tota	1==>	19,346	245	0	24,791	100.00	•	,407	100.00 *	-28,984	-29,775	100.
1 1			000	יים ודמס פעדו פו	TI COTTON						AREAS	
	Total C	anacity	Sens Can	Coil Airfl	Enteri	na DB/WB/I	iR Lea	vina l	D8/W8/HR	Gross Total		
				(cfm)					F Grains	Floor 1		, (,
									2 74.2		0	
x Clg	0.0	0.0	0.0	0		0.0 0		0.	0.0	ExFlr	0	
t Vent	0.0	0.0	0.0	0		0.0 0		0.		Roof	Ō	0
tals	2.1	24.8	0.0	v	V. C	0.0				Wall	561	75
		COTI CC	ECTION		AI	acione (c	fm)		-ENGINEERING	CHECKS	TEMPERATUR	FS (F)-
		Coil A			Туре	Cooling	Heating		lg % OA	10.0	Type Cl	
		(cfi		-	Vent	110	(lg Cfm/Sqft		SAD8 62	-
	(Mbh) -29.8		100 67.3	-	Infil	236	236		lg Cfm/Ton		Plenum 75	
in Htg			0 0.0			1,100	1,100		lg Sqft/Ton		Return 75	
x Htg	0.0				Supply	-	1,100		lg Btuh/Sqft		Ret/OA 76	
eheat	-0.0		100 61.0		Mincfm	1 100	1,100		o. People	7	Runarnd 75	
heat	0.0		0. 0.0		Return	1,100	- (tg % OA			.3
midif t Vent	0.0		0 0.0		Exhaust Rm Exh	110	. (tg Cfm/Sqft			.2
* 11-n4	0.0	1	0 0.0	1 (1.1)	PR FVN	13				1 17.1		

System 9 Peak SZ - SINGLE ZONE

	t Time ==>		Mo/Hr:					/Hr:		****** HEATI	Mo/Hr: 13/ 1	
Outside	Air ==>	0A		91/ 74/105.	0				91 *		OADB: 4	
			,				t .		*			
		Space		Ret. Air		Percnt		pace				Perch
	Se	ns.+Lat.	Sensible		Total			ible		•		Of To
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)			tuh)	(%) *		(Btuh)	(%
Skylit	e Solr	0	0		0			. 0	0.00 *		. 0	
Skylit	e Cond	0			0			0	0.00 *			0.0
Roof C	ond	1,065	0		1,065	5.14	k 1	,232	12.21 *	-1,238	-1,238	
Glass	Solar	2,026	0		2,026	9.79	t 1	,882	18.66 *	0	0	
Glass	Cond	514	0		514	2.48	k	541	5.37 *		-2,607	
Wall C	ond	485	0		485		k	516	5.11 *	-1,633	-1,633	7.5
Partit	ion	0			0	0.00	ķ	0	0.00 *	0	0	0.0
Expose	d Floor	0			0	0.00	k	0	0.00 *	0	0	0.0
Infilt	ration	5,643			5,643	27.25	k 4	,022	39.88 *	-16,088	-16,088	74.6
		9,733	0		9,733			,192			-21,566	
nternal		•		•	,		ķ		*		,	
Lights		1,729	0		1,729	8.35	k 1.	,729	17.15 *	0	0	0.0
People		311			311			163	1.62 *		0	0.0
Misc		0	0	0	0			0			0	0.
	tal==>	2.040	0	0	2,040			.893	18.77 *		0	0.0
eiling		0			0			-	0.00 *		0	0.
tside		0	0		8,794			0	0.00 *		0	0.
ıp. Fan					142				0.00 *		0	0.
et. Fan			0		0				0.00 *		0	0.0
uct Hea			0		0				0.00 *		0	0.0
//UNDR		0	·		0			0			0	-0.0
xhaust	=	•	0	0	0				0.00 *		0	0.0
	Bypass		0	-	0				0.00 *		0	0.0
J 1 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0, 2000		•	•	•		k		*		•	
rand To	tal==>	11,774	0	. 0	20,710	100.00	10,	,085	100.00 *	-21,566	-21,566	100.0
7			225								40540	
				LING COIL SE Coil Airfl						Gross Total	AREAS Glass (s	
•	(Tons)			(cfm)								,,, (4)
in Clg			16.1						91.7		0	
x Clg	0.0	0.0	0.0	1,000		0.0 0.0		0.0	0.0	Exflr	0	
t Vent	0.0	0.0	0.0	0		0.0 0.0		0.0	0.0	Roof	544	0
tals	1.7	20.7	0.0	U	0.0	0.0 0.0	0.0	0.0	0.0	Wall .	550	72
tais	1.7	20.1								mair .	330	12 1
			ECTION		AI				ENGINEERING		TEMPERATURE	
	Capacity				Type	Cooling	Heating		3 % OA	36.0	Type Clo	
	(Mbh)	(cf		-	Vent	360	.0	-	g Cfm/Sqft		SADB 65.	
in Htg	-21.6	1,	000 68.0	87.8	Infil	231	231		g Cfm/Ton		Plenum 75.	
x Htg	0.0		0.0	0.0	Supply	1,000	1,000	Clo	sqft/Ton	315.21	Return 75.	0 68
eheat	-22.5	1,	000 45.0	65.6	Mincfm	0	0	Clg	g Btuh/Sqft	38.07	Ret/OA 80.	6 68
heat	0.0		0 0.0	0.0	Return	1,000	1,000	No.	. People	4	Runarnd 75.	.0 68
midif	0.0		0.0	0.0	Exhaust	360	. 0	Htg	3 % OA	0.0	Fn MtrID 0.	0 0
t Vent	0.0		0 0.0	0.0	Rm Exh	0	0	Htg	g Cfm/SqFt	1.84	Fn BldTD 0.	0 0.
	-21.6				Auxil							

System 10 Peak SZ - SINGLE ZONE

		*******	Mo/Hr:					/Hr:		K	Mo/Hr: 13/	
Peaked at			DB/WB/HR:		٨				89 3		OAD8: -4	
Dutside F	HIT>	UH	Dalmaluv.	71/ 14/105.	V		*	. מעח		(טעאט. • 4	
		Space	Ret Air	Ret. Air	Net	Percnt	* 5	pace	Percnt *	Space Pea	ak Coil Pea	k Percn
	S	ens.+Lat.	Sensible		Total			ible		•		
Envelope		(Btuh)	(Btuh)					tuh)	(%)			
Skylite		0	0		0			0	0.00		1	0.0
Skylite		0	-		0			0	0.00		0	0 0.0
Roof Co		0			0			0			0	0 0.0
Glass S		4,550	0		4,550			,777			0	0 0.0
Glass C		807	ő		807			820	4.01 3		8 -4,09	
		3,085	343		3,428			,726				
Partiti		0,000	040		0,420			, , , 20	0.00		_	0 0.0
		=			. 0			0			Ĭ.	0 0.0
Exposed		7 055			-						6 -19,30	
Infiltr		7,055	7.17		7,055				20.94			
Sub Tot		15,497	343		15,840			,606			35,39	4 100.0
Internal	Loads				4.857		*	0.00	k 00.40		•	
Lights		4,886	0		4,886			,020			0	0 0.0
People		853			853			769	3.76 *		0	0.0
Misc		. 0	0		Û			0	0.00		0	0.0
		5,739			5,739						0	0.0
Ceiling L		54			0			65	0.32 *			0.0
Outside A		0	0	0	19,852			0	0.00		0	0.0
Sup. Fan					683				0.00			0.0
Ret. Fan			0		0				0.00 *			0.0
Duct Heat			0		0				0.00 *			0.0
OV/UNDR S		. 0			0			0	-0.00 *		0	0.0
Exhaust H			-94	•	-94	-0.22			0.00			0.0
Terminal	8ypass		0	0	0	0.00			0.00 *		• .	0.0
							*		*			
Grand Tot	(al==>	21,290	195	. 0	42,020	100.00	* 20	,459	100.00 *	-34,38	32 -35,39	4 100.0
			000								AREAS	
			Sens Cap.							Gross Tota		(sf) (%)
			(Mbh)									
			32.6								0	
ux Clg	0.0	0.0	0.0	0		0.0 0.		0.0		ExFlr	0	
pt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	0	0
otals	3.5	42.0								Wall .	660	114 1
			ECTION		AI	RFLOWS (cf.	m)		ENGINEERING		TEMPERATU	RES (F)
	Capacit	•			Type	_	Heating		g % OA	32.5		lg Htg
	(Mbh)	-			Vent	780	0		g Cfm/Sqft	1.56		7.2 81.
ain Htg	-35.		400 67.6		Infil	277	277		g Cfm/Ton			5.1 67.
ux Htg	0.0		0.0	0.0	Supply	2,400	2,400		g Sqft/Ton	438.93		5.1 67.
reheat	-52.	1 2,	400 46.9	66.9	Mincfm	0	0		g Btuh/Sqft			0.1 67.
eheat	0.	0	0.0	0.0	Return	2,400	2,400	No	. People	10	Runarnd 7	5.0 68.
umidif	0.	0	0.0	0.0	Exhaust	780	0		g % OA	0.0	Fn MtrTD	0.1 0.
pt Vent	0.	0	0.0	0.0	Rm Exh	0	0	Ht	g Cfm/SqFt	1.56	Fn BldTD	0.0 0.
otal	-35.				Auxil	0	0	114	g Btuh/SqFt	-23.03	Fn Frict	0.1 0.

System 11 Peak SZ - SINGLE ZONE .

******	*******	****** CC			********	******				***** HEAT			******
	it Time ==>		Mo/Hr: 7			*	•		/22 *		Mo/Hr: 1	3/1	
Outside	Air ==>	DAO	8/WB/HR: 9	1/ 74/105.0	0	, ,	* 0A	DB: 7	'9 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* Sp	ace	Percnt *	Space Pea	k Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot 1			Of Tot *	•			Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (8t	uh)	(%) *	(Btul	1) (8	tuh)	(%)
Skylit	e Solr	0	0		0	0.00	*	0	0.00 *		0	0 -	0.00
Skylit	e Cond	0	0		0	0.00	k	0	0.00 *		0	0	0.00
Roof C	ond	0	0		0	0.00	k	0	0.00 *		0 .	0	0.00
Glass	Solar	0	0		0	0.00	k	0	0.00 *		0	0	0.00
Glass	Cond	0	0		0	0.00	ķ	0	0.00 *		0	0	0.00
Wall C	ond	0	0		0	0.00	k	0	0.00 *		0	0	0.00
Partit	ion	0			0	0.00	ķ	0	0.00 *		0	0	0.00
Expose	d Floor	0			0	0.00	k	0	0.00 *		0	0	0.00
Infilt	ration	0			0	0.00	ķ	0	0.00 *		0	0	60.74
	tal::>	0	0		0	0.00	ķ	0	0.00 *		0	0	60.74
Internal	Loads					4	ķ .		. *				
Lights	;	13,815	0		13,815	10.50	18,	290	76.69 *		0	0	0.00
People)	2,183			2,183	1.66	ķ 5,	560	23.31 *		0	0	0.00
Misc		0	0	0	0	0.00	ŧ	0	0.00 *		0	0	0.00
Sub To	tal==>	15,998	0	0	15,998	12.15	23,	851	100.00 *		0	0	0.00
Ceiling	Load	0	0		0	0.00 *	ţ.	0	0.00 *		0	. 0	0.00
Outside		0	0	0	99,839	75.85 *	k	0	0.00 *		0	0	0.00
Sup. Fan	Heat				15,787	11.99	ķ		0.00 *			0	0.00
Ret. Fan			0		0	0.00	k .		0.00 *			0	0.00
Duct Hea	it Pkup		0		0	0.00	ķ		0.00 *			0	0.00
OV/UNDR	Sizing	0			0	0.00 *	ķ.	0	0.00 *		0	0	39.26
Exhaust	Heat		, 0	0	0	0.00	ķ		0.00 *			0	0.00
Terminal	Bypass		ŋ	0	0	0.00	k		0.00 *			0	0.00
Grand To	tal==>	15,998	0	0	131.624	100.00	; ; 23.	851	100.00 *		0	0	100.00
		,			,		,		******		•	•	
				ING COIL SE							AREAS-		
	Total C		Sens Cap. (g D8/W8/HF			/W8/HR	Gross T ot a		ss (sf	(%)
•	(Tons)	(Mbh)	(Mbh)	(cfm)		F Grains	-	Deg F	Grains	Floor	4,223		
Main Clg	11.0	131.6	115.8	11,100	82.0 71	.6 102.7	71.7	68.4	101.9	Part	0		
Aux Clg	0.0	0.0	0.0	0.		.0 0.0		0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.0	0.0	0.0	0.0	Roof	0		0 0
Totals	11.0	131.6								Wall	0		0 0
	HEATING	COIL SELE	CTION		AIR	FLOWS (cfm	(1)	ε	NGINEERING	CHECKS	TEMPER	ATURES	(F)
	Capacity	Coil Ai	rfl Ent			Cooling	Heating		% OA	45.4	Type	Clg	Htg
	(Mbh)	(cfm) Deg F		Vent	5,040	0		Cfm/Sqft	2.63	SAD8	73.0	
Main Htg	-1.2			68.1	Infil	0	0	_	Cfm/Ton		Plenum	75.0	
Aux Htg	0.0		0.0	0.0	Supply	11,100	11,100		Sqft/Ton	385.00	Return	75.0	
Preheat	-395.9		00 38.9	71.7	Mincfm	0	. 0		Btuh/Sqft		Ret/OA	82.0	
Reheat	0.0		0.0	0.0	Return	11,100	11,100	_	People	28	Runarnd	75.0	
Humidif	0.0		0.0	0.0	Exhaust	5,040	. 0		% OA	0.0	Én MtrTD		
Opt Vent	0.0		0.0	0.0	Rm Exh	0	0		Cfm/SqFt	2.63	Fn BldTD		
Total	-1.2				Auxil	0	0	-	Btuh/SqFt	-0.29	Fn Frict	0.7	0.0
								•					

System 12 Peak SZ - SINGLE ZONE

	at Time =		Mo/Hr:	L PEAK **** 7/14				Mo/Hr:		t	Mo/Hr:		
			•	91/ 74/105.	0				83	t	OAD8:	-	
		Space	Ret. Air	r Ret. Air	Net.	Percnt	*	Space	Percnt ?		leak (nil	Peak	Percnt
		Sens.+Lat.	Sensible		Total			nsible				Sens	Of Tot
Envelope		(Btuh)	(Btuh		(Btuh)	(%)		(Btuh)	(%)			Btuh)	(%)
		0	,)	0			0	0.00	•	0	0	0.00
_	e Cond	Ö	·	,)	•	0.00		0	0.00		0	0	
Roof C		3,816	ì)	3,816			4,109		-4,	•		
	Solar		(,)	0,510			0	0.00		0	0	0.00
Glass		Ŏ	(•	Ö			0	0.00		0	Ö	0.00
Wall (384	Ò	-	384			481	0.84		_	1,693	
Partit		0	`	,	. 0	0.00		0	0.00	,	0		0.00
	d Floor	0			0	0.00		0	0.00 4			. 0	
	ration	-			-			-				0	
		4 100	,		0			0	0.00		479 -1		
		4,199	()	4,199	0.96		4,591	8.04 *		645 -2	0,645	100.00
Internal		(7/1	,		/ 7/4	4 45	*	0 (22					
Lights		6,341	()	6,341	1.45		8,153			0	0	0.00
	:	1,049	75 /5	7 6 / 5	1,049			2,032			0	0	0.00
Misc		9,082			45,408			8,467			0	0	0.00
					52,798				32.66 *		0	0	0.00
Ceiling		0			0	0.00		0	0.00 *		0	0	0.00
		0	C	0	311,339			0	0.00 *		0	0	0.00
Sup. Fan			0		35,840	8.18			0.00 *			0	0.00
Ret. Fan					0	0.00			0.00 *			0	0.00
Duct Hea		** * *		;	0				0.00 *			0	0.00
OV/UNDR	-	33,869			33,869			3,869	59.30 *		0	0	-0.00
Exhaust			, 0		0	0.00			0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
Grand To	tal==>	54 540	32 AQA	7 8/10	438,045	100.00	* 4	7 111	100 00 *	-20,	445 -2	0 445	100.00
diana io		57,570	32,430	0,040	450,045	100.00	,,	7,111	100.00	- 20,	043 "2	0,043	100.00
			C00	LING COIL SI	ELECTION						AREAS		
	Total			Coil Airfl					DB/WB/HR				f) (%)
14				(cfm)					F Grains		1,966		., (*,
Main Clq									4 99.0	Part	0	•	
Aux Clg	0.0	0.0	0.0	0.		.0 0.				ExFlr	0		•
Opt Vent	0.0	0.0	0.0	0		.0 0.				Roof	1,966		0 0
Totals	36.5	438.0		v	0.0			•	• • • • • • • • • • • • • • • • • • • •	Wall	495		0 0
	UCATTU	0 0071 071	FATTON										
			ECTION		AIR				-ENGINEERING		TEMPE		. ,
		y Coil A		Lvg	• .	Cooling	Heating		lg % OA	80.0	Type	Clg	
•	(Mbh)	,	_		Vent	14,400			lg Cfm/Sqft	9.16	SADB	72.1	
Main Htg	-20.				Infil	0	20		lg Cfm/Ton	493.10	Plenum	75.0	
Aux Htg	0.		0 0.0		Supply	18,000	18,00		lg Sqft/Ton	53.86	Return	85.5	
Preheat	-1,047.				Mincfm	0			lg Btuh/Sqft		Ret/OA	89.5	
Reheat	0.		0, 0.0		Return	2,850	18,00		o. People	13	Runarnd		
Humidif	0.		0 0.0		Exhaust	0	•		tg % OA	0.0			
Opt Vent	0.		0 0.0	0.0	Rm Exh	15,150			tg Cfm/SqFt	9.16	Fn 81dTi	D 0,3	3 0.0
Total	-20.	,			Auxil				tg Btuh/SqFt	-10.50	Fn Fric		0.0

System 13 Block FC - FAN COIL

peaxed a Dutside	t Time ==> Air ==>		Mo/Hr: DB/WB/HR: :	•	0				7/20 * 83 *		Mo/Hr: 1 OADB:	3/ 1	
•		Space	Ret. Air	Ret. Air	Net	Percnt	* * \$	pace	* Percnt *		eak Coil	Peak	Percni
	Se	ns.÷Lat.	Sensible	Latent	Total	Of Tot	* Sens	ible	Of Tot *			Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(%)	* (B	tuh)	(%) *	(Bt	uh) (E	tuh)	(\$
Skylit	e Solr	0	0		0	0.00	*	0	0.00 *		0	0	0.0
Skylit	e Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.0
Roof C	ond	108	0		108	20.93	*	108	28.50 *	-	116	-116	99.9
Glass	Solar	0	0		0	0.00	*	0	0.00 *		0	0	0.0
Glass	Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.0
Wall Co	ond	. 0	0		0	0.00	*	0	0.00 *		0	0	0.0
Partit:	ion	0			0	0.00	*	0	0.00 *		0	. 0	0.0
Expose	d Floor	0			0	0.00	*	0	0.00 *		0	0	0.0
Infilt	ration	0			. 0	0.00	*	0	0.00 *		0	0	0.0
Sub To	tal==>	108	0		108	20.94	*	108	28.50 *	-	116	-116	100.0
nternal	Loads						*		. *				
Lights		216	0		216	41.96	*	216	57.12 *		0	0	0.0
People		163			163	31.58	*	54	14.37 *		0	0	0.0
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.0
Sub To	tal==>	379	0	0	379	73.54	*	271	71.50 *		0	0	0.0
eiling !	Load	0	0		0	0.00	*	0	0.00 *		0	0	0.0
utside A	Air	0	0	0	0	0.00	*	, 0	0.00 *		0	0	0.0
Sup. Fan	Heat				28	5.52	*		0.00 *			0	0.0
let. Fan	Heat		0		0	0.00	*		0.00 *			0	0.0
ouct Heat			0		0	0.00	*	**	0.00 *			0	0.0
V/UNDR S	Sizing	0			0	0.00	*	0	0.00 *		0	0	0.0
xhaust l	Heat		, 0	0	0	0.00	*		0.00 *			0	0.0
erminal	Bypass		0	0	0	-0.00	*		0.00 *			0	0.0
arand To	tal==>	487	0	0	515	100.00	*	378	100.00 *		116	-116	100.0
			000	THE COTE OF	CLECTION-		ده چې ډيد چې چې چې د د			******	AREAS-		
v	Total Ca	apacity	Sens Cap.			g DB/WB/H			3/WB/HR	Gross To		ss (sf	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grain	s Deg F	Deg F	Grains	Floor	51		
in Clg	0.0	0.5	0.4	200	75.1 69	.0 99.	8 73.2	68.3	99.1	Part	0		
ıx Clg	0.0	0.0	0.0	0.	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
t Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	51		0
tals	0.0	0.5								Wall	0		0
	HEATING	COIL SELE	ECTION		AIR	FLOWS (cf	m)	8	NGINEERING	CHECKS	TEMPER	.ATURES	(F)
			irfl Ent	Lvg	Type		Heating	Clg	3 % OA	0.0	Type	Clg	
	(Mbh)		m) Deg F	-	Vent	0	0		; Cfm/Sqft		SADB	73.3	68.
2 - 114 -	-0.1		200 68.0		Infil	0	0		cfm/Ton		Plenum	75.0	68.
-	0.0		0.0		Supply	200	200	_	; Saft/Ton		Return	75.0	68.
x Htg	-1.1		200 68.0		Mincfm	0	. 0		βtuh/Sqft		Ret/OA	75.0	68.
x Htg eheat			0.0	0.0	Return	200	200	No.	People	0	Runarnd	75.0	68.
in Htg x Htg eheat heat	0.0		0, 0.0										
x Htg eheat heat midif	0.0		0 0.0	0.0	Exhaust	0	- 0	Htg	3 % OA	0.0	Fn MtrTD	0.0	0.
x Htg eheat						0 0	- 0	Htg Htg	3 % OA 3 Cfm/SqFt 3 Btuh/SqFt	0.0 3.92			

by. Hane tustomer birest service hethork

. System 14 Elock RAD - RADIATION

	at Time ==>		Mo/Hr:	•			*		Hr: 0	1/0 *		Mo/Hr: 13/	l
Outside	Air ==>	ĴĄ	D8/W8/HR:	0/ 0/ 0.	0		*	0A	DB:	0 *		0AD8: 4	
•		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sn	ace	* Percnt *		k Coil Pea	k Percn
	Sen	e.+Lat.	Sansible	Latent	Total			Sensi		Of Tot *			
Envelope		(Stuh)	(Btuh)	(Btuh)	(Btuh)	(%)			uh)	(%) *			
	ta Solr	ŋ	0	, ,	0	0.00		`	Ó	0.00 *			0.0
	te Cond	9	0		0	0.00			0	0.00 *		0	0.0
Roof (0	0		0	0.00			0	0.00 *		7 -8,18	
	Solar	0	0		0	0.00	*		0	0.00 *		_	0.0
Glass	Cond	0	0		0	0.00	*		0	0.00 *		8 -23,24	
Wall (0	0		0	0.00	*		0	0.00 *	,		
Partit	tion	0			- 0	0.00	*		0	0.00 *		_	0.0
Expose	ed Floor	0			0	0.00	*		0	0.00 *		0	0.0
	tration	0			0	0.00			0	0.00 *		3 -176,85	
	otal==>	0	0		0	0.00			0	0.00 *		•	
Internal							*			. *		,	
Lights		0	0		0	0.00	*		0	0.00 *		0	0.0
Paople		0			0	0.00			0	0.00 *		0	0.0
Misc	_	0	0	0	0	0.00			0	0.00 *		0	0.0
	otal==>	0	0	0	0	0.00			0	0.00 *		0	0.0
Ceiling		0	0	_	0	0.00			0	0.00 *		7	0.0
Outside		0	0	0	0	0.00			0	0.00 *			0.0
Sup. Far		•	•	•	0	0.00			·	0.00 *		•	0.0
Ret. Fan			0		0	0.00				0.00 *			0.0
Duct Hea			0		0	0.00				0.00 *			0.0
OV/UNDR		0			0	0.00			0	0.00 *		0	0.0
Exhaust	-		, 0	0	0	0.00			•	0.00 *		-	0.0
Terminal			C	0	0	0.00				0.00 *			0.0
					-		*			*			
Grand To	otal==>	C	0	0	0	0.00	*		0	.0.00 *	-307,05	7 -300,36	1 100.0
			<u>-</u>	ING COIL SE	ELECTION							AREAS	
	Total Ca	pacity		Coil Airfl		g D8/W8/	'HR	Leav	ina DB	/WB/HR	Gross Tota		(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg			Deg F				9,084	(0,)
Main Clg	0.0	0.0	0.0	0	-		0.0	0.0	0.0	0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0.			0.0	0.0	0.0	0.0	ExFlr	0	
opt Vent	0.0	0.0	0.0	0			.0	0.0	0.0	0.0		3,164	0
Totals	0.0	0.0			•		••	•••				6,046	
	HEATING	COIL SELI	ECTION		AIR	FLOWS (c	fm)-		E	NGINEERING	CHECKS	TEMPERATU	RES (F)
	Capacity			Lvg		Cooling	Н	leating	Cla	% OA	0.0		lg Htg
		(cf			Vent	0	•	0	Cla	Cfm/Sqft			0.0 68.
lain Htg	-300.4	,	0 0.0	_	Infil	0		2,539	Cla	Cfm/Ton			0.0 65.
Aux Htg	0.0		0 0.0		Supply	0		0	Cla	Sqft/Ton).0 65.
reheat	0.0		0 0.0		Mincfm			0		Btuh/Sqft).0 65.
Reheat	0.0		0. 0.0		Return	0		0	_	People	0.00).0 68.
lumidif	0.0		0 0.0		Exhaust	0				% OA	0.0	•).0 0.
omiui. Opt Vent	0.0		0 0.0		Rm Exh	0		0	_	Cfm/SqFt).0 0.
			v v.v	v.v									0.0 0.
Total	-300.4				Auxil	0		0		Btuh/SqFt			

BUILDING U-VALUES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

-----BUILDING U-VALUES-----

		~~~~			Roo	m U-Val	ues				Room	Room
						/hr/sqf					Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
- 2	RAD ONLY	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
Zone	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
System	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
3	ATTIC	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	. 22.6	8.52
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
4	OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.230	0.000	55.0	15.45
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
5	PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	.17.0	6.01
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
6	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
System	6 Total/Ava.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
7	MECH ROOM	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
Zone	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
System	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
_ 8	LOBBY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
System	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
9	PRIVATE DINING	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
System	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6 53.3	18.47
10	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05 14.05
System	10 Total/Ave. BALL ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.000	0.317	6.2	3.70
11	11 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2	3.70
Ione	11 Total/Ave.				0.000	0.000			0.000	0.317	6.2	3.70
System	KITCHEN	0.000	0.000	0.000	0.000		0.000	0.000	0.053	0.000	40.1	9.02
Zone	12 Total/Ave.	0.000 0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
System	12 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
13	KITCHEN OFFICE	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
Zone	13 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
System	13 Total/Ave.	0.000		0.000	0.000	0.036	0.000		0.000	0.000	22.2	5.22
3	ATTIC	0.000	0.000	0.000	0.000	0.038	0.550	0.563	0.258	0.000	22.6	8.52
Zone	3 Total/Ave.				0.000	0.041	0.550	0.563	0.258	0.000	22.6	8.52
2011e	OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.280	0.000	55.0	15.45
20ne 5	PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.250	0.317	17.0	6.01
Zone	5 Total/Ave.	0.000	0.000	0.000 0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
2011e	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
Zone	6 Total/Ave.		0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	91.7	22.48
2011e		0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
0		V.000	V.VVV	V. VVV	0.000	V. 000	V.JJV	0.500	V. 070	0.017	. 00.0	10,71

BUILDING U-VALUES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

BUILDING U-VALUES-----

													Room Capac.
Room					Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Desc	ription	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
Zona	8	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	66.3	16.91
9	PRIVA	TE DINING	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
Zone	9	Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
10	DININ	G ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
Zone	10	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.343	0.317	53.3	14.05
System	14	Total/Ave.	0.000	0.000	0.000	0.000	0.040	0.550	0.563	0.267	0.317	52.0	13.93
Buildin	g		0.144	0.000	0.000	0.000	0.039	0.550	0.563	0.225	0.317	48.2	12.57

BUILDING AREAS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- BUILDING AREAS -----

				Floor	Total		Exposed						
		Numb	er of	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window		Net Wall
Room		,	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
i	LIQUOR STORE	1	1	1,073	1,073	0	0	0	0	0	0	0	0
Zone	1 Total/Ave.				1,073	0	0	0	0	0	0	0	0
System	1 Total/Ave.				1,073	0	0	0	0	0	0	0	0
_	RAD ONLY		1	2,856	2,856	342	0	0	0	2,153	305	12	2,148
Zone	2 Total/Ave.				2,856	342 342	0	0	0	2,153 2,153	305 305	12 12	2,148 2,148
System	2 Total/Ave. ATTIC		1	1,354	2,856 1,354	0	0	0	0	1,354	14	1	1,372
Zone	3 Total/Ave.		1	1,334	1,354	0	0	0.	0	1,354	14	1	1,372
System	3 Total/Ave.				1,354	Ŏ	0	0	0	1,354	14	1	1,372
-	OFFICES		1	1,266	1,266	0	0	0	0	1,266	71	5	1,243
Zone	4 Total/Ave.		•	1,100	1,266	0	0	0	0	1,266	71	5	1,243
System	4 Total/Ave.				1,266	0	0	0	0	1,266	71	5	1,243
	PARTY ROOMS		1	1,748	1,748	0	0	0	0	0	153	36	267
Zone	5 Total/Ave.		_	,	1,748	0	0	0	. 0	0	153	36	267
System	5 Total/Ave.				1,748	0	0	0	0	0	153	36	267
•	LOUNGE		1	1,564	1,564	0	0	0	0	0	146	13	1,009
Zone	6 Total/Ave.				1,564	0	0	0	0	0	146	13	1,009
System	6 Total/Ave.				1,564	0	0	0	0	0	146	13	1,009
7	MECH ROOM	1	1	469	469	108	0	0	0	0	0	0	0
Zone	7 Total/Ave.				469	108	0	0	0	0	0	0	0
System	7 Total/Ave.				469	108	0	0	0	0	0	0	0
8	LOBBY	i	1	1,071	1,071	0	0	0	0	0	75	13.	
Zone	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
System	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	72	13	478
Zone	9 Total/Ave.				544	0	0	0	0	544	72 72	. 13	478
System	9 Total/Ave.		1	1 577	544	0	U	0	0	544 · 0		13 17	. 478 546
	DINING ROOM	1	1	1,537	. 1,537	0	0	0	0	0	114 114	17	546
Zone	10 Total/Ave.				1.537 1,537	0	0	0	0	0	114	17	546
System	10 Total/Ave. BALL ROOM		1	4,223	4,223	0	0	0	0	0	0	0	0
	11 Total/Ave.		1	4,220	4,223	0	0	0	0	0	0	0	0
Zone System	11 Total/Ave.				4,223	0	. 0	. 0	Ö	0	0	Ö	0
	KITCHEN		1	1,966	1,966	0	0	ō	. 0	1,966	0	0	495
Zone	12 Total/Ave.		•	1,700	1,966	0	0	0	0	1,966	0	Ö	495
System	12 Total/Ave.				1,966	0	0	0	0	1,966	0	0	495
	KITCHEN OFFICE		1	51	51	Ő	0	0	0	51	0	0	0
Zone	13 Total/Ave.		-		51	0	0	0	0	51	0	0	0
System	13 Total/Ave.		•		51	0	- 0	0	0	51	. 0	0	0
	ATTIC	1.	1	1,354	1,354	0	0	0	0	1,354	14	1	1,372
Zone	3 Total/Ave.				1,354	0	0	0	0	1,354	14	1	1,372
	OFFICES	1	1	1,266	1,266	0	0	0	0	1,266	71	5	1,243
Zone	4 Total/Ave.				1,266	0	0	Ō	0	1,266	71	5	1,243
5	PARTY ROOMS	1	1	1,748	1,748	0	0	0	0	0	. 153	36	<b>26</b> 7
Zone	5 Total/Ave.			•	1,748	0	0	0	0	0	153	36	267
	LOUNGE	1	1	1,564	1,564	0	0	0	0	. 0	146	13	1,009
Zone	6 Total/Ave.			,:	1,564	0	0	0	0	0	146	13	1,009
8	LOBBY	· 1	1	1,071	1,071	0	0	. 0	. 0	. 0	75	13	<b>48</b> £

-BUILDING AREAS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- BUILDING AREAS-----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
Zone	8 Total/Ave.				1,071	0		0	٨	0	75	13	107
9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	73	13	486 478
Zone	9 Total/Ave.				544	0	0	0	0	544	72	13	478
-10	DINING ROOM	1	1	1,537	1,537	0	0	0	0	0	114	17	546
Zone	10 Total/Ave.				1,537	0	0	0	0	0	114	17	546
System	<pre>14 Total/Ave.</pre>				9,084	0	0	0	0	3,164	645	11	5,401
Buildin	g				28,806	450	0	0	0	10,498	1,596	11	13,444

ASHRAE 90 ANÁLYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.039 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.260 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.10 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 13.34 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

## System Totals

Percent	Cool	ling Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design		Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	4.7	84	5,210	-140,211	30	1,117	2,357.7	29	2,555	0.0	0	0
5 - 10	9.4	3	189	-280,422	26	950	4,715.5	0	0	0.0	0	. 0
10 - 15	14.1	5	323	-420,633	25	932	7,073.2	0	0	0.0	0	0
15 - 20	18.7	4	235	-560,844	6	226	9,431.0	0	0	0.0	0	0
20 - 25	23.4	3	167	-701,056	13	477	11,788.7	0	0	0.0	0	0
25 - 30	28.1	1	81	-841,267	- 0	0	14,146.4	0	0	0.0	0	0
30 - 35	32.8	0	0	-981,478	0	0	16,504.2	0	0	0.0	0	0
35 - 40	37.5	0	0	-1,121,689	0	0	18,861.9	0	0	0.0	0	0
40 - 45	42.2	0	0	-1,261,900	0	0	21,219.7	0	0	0.0	0	0
45 - 50	46.9	0	0	-1,402,111	0	0	23,577.4	0	0	0.0	0	0
50 - 55	51.5	0	0	-1,542,322	0	0	25,935.1	0	0	0.0	0	0
55 - 60	56.2	0	0	-1,682,533	0	0	28,292.9	0	0	0.0	0	0
60 - 65	60.9	0	0	-1,822,745	0	0	30,650.6	0	0	0.0	0	0
65 - 70	65.6	0	0	<b>-1</b> ,962,956	. 0	0	33,008.4	0	0	0.0	0	0
70 - 75	70.3	0	0	-2,103,167	0	0	35,366.1	0	0	0.0	0	0
75 - 80	75.0	0	0	-2,243,373	0	0	37,723.9	0	0	0.0	0	0
80 - 85	79.7	0	0	-2,383,589	0	0	40,081.6	0	0	0.0	0	0
85 - 90	84.3	0	0	-2,523,800	0	0	42,439.3	71	6,205	0.0	0	0
90 - 95	89.0	0	0	-1,664.012	0	C	44,797.1	0	0	0.0	0	0
95 - 100	93.7	0	0	-2.804,223	0	0	47,154.8	0	0	0.0	0	0
Hours Off	0.0	0	2,555	. 0	0	5,058	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

					BUII	LDI	N G	TEM	PER	ATU	R E P	R O F	ILE	\$						
														:						
Temperature							~~~~~			Zone N	umher -									
Range	1	2	3	4	5	6	7	8				12	13	3	4	5	4	Я	9	
(F)	•		J	7	,	Ü	,	Ū	,	10	**	11	10	·		,	·	٠	,	
Max. Temp.	38.0	92.3	78.8	78.8	79.9	79.2	71.2	79.4	78.5	79.5	79.9	96.7	80.0	103.3	103.4	161.7	103.3	111.9	115.3	
Mo./Hr.	$1 \cdot 1$	8 22	7 24	7 24	7 5	7 5	9 16	7 5	7 24	7 5	6 5	7 15	7 5	7 22	8 22	8 22	8 23	8 22	8 22	
Day Type	1	1	1	1	1	1	4	1	1	1	2	1	1	1	1	1	1	1	1	
									Nu	nber o	f Hours	3	- <b></b>			<i>.</i>				
Above 100	0	0	0	0	0	0	0	0	0	0		0	0	245	590	4.206	1.086	2,562	2.640	- 5
95 - 100	0	0	0	0	0	0	0	0	0	0	0	0	0		1,198		1,134	366	288	
90 - 95	0	868	0	0	0	0	0	0	0	0	0	138	0		1,026			87	48	3
85 - 90	0	1,276	0	0	0	0	0	0	0	0	0	778	0	770	,			372	196	135
80 - 85	0		0	0	0	0	0	0	0	0	0	1,174	0	630	498	899	482	603	332	
75 ~ 80	0	131	2,474	3,122	3,672	3,029	0	3,672	2,732	3,327	2,801	820	4,107	0	72	444	674	321	584	
70 - 75	0	800	858	550	0	643	1,563	0	940	413	658	213	4,653	0	153	1,188	246	313	108	
65 - 70	. 0	4,421	3,817	3,964	3,518	2,985	3,387	1,448	3,497	3,794	443	884	0	3,785	3,942	1,536	4,076	3,838	3,922	
60 - 65	0	480	859	916	1,363	1,459	3,810	736	1,493	1,185	695	852	0	700	789	22	318	298	642	
55 - 60	0	0	544	208	207	644	0	670	98	41	782	576	0	454	204	0	0	0	0	
50 - 55	0	0	208	0	0	0	0	1,238	0	-		615	0	149	0	0	0	0	0	
8elow 50	8,760	0	0	0	0	0	0	996	0	0	2,509	2,710	0	0	0	0	0	0	0	
Min. Temp.	38.0	62.6	50.8	57.4	56.4	55.2	60.2	43.4	58.1	59.4	33.9	30.2	67.9	55.0	57.4	63.7	62.9	63.3	61.1	
Mo./Hr.	1 1	2 6	2 6	2 6	2 11	2 9	3 20	2 8	2 6	2 9	2 10	2 8	1 6	1 5	2 6	1 6	2 6	2 6	2 6	
Day Type	1	1	4	4	5	5	5	5	5	5	4	4	1	1	4	1	4	4	1	

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

		BUILDING TEMPERATURE PROFILES
Range (F)	10	
Max. Temp.	114.7	
Mo./Hr.	8 22	
Day Type	0 22	
bay Type	1	
Above 100	2,928	
95 - 100	0	
90 - 95	332	
85 - 90	502	
80 - 85	499	
75 - 80	171	
70 - 75	.936	
65 - 70	3,193	
60 - 65	199	
55 - 60	0	
50 - 55	0	
Below 50	0	·
Min. Temp.	63.5	
Mo./Hr.	2 6	
Day Type	4	
bay ilbe	7	

MONTHLY ENERGY CONSTMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	HOT WTR On Peak (Therm)	STEAM DMND On Peak (Thrm/hr)	HOT W DMND On Peak (Thrm/hr)
Jan	56,133	112	102	1,383	0	5
Feb	50,686	112	. 92	1,401	0	5
March	53,675	112	102	. 809	0	5
April	48,350	123	<b>9</b> 9	259	0	5
May	46,454	139	0	0	0	0
June	51,525	149	0	0	0	0
July	61,924	157	0	0	0	0
Aug	53,777	150	0	0	0	0
Sept	45,492	143	0	0	0	0
0ct	49,041	116	77	127	0	3
Nov	49,777	122	99	436	0	5
Dec	55,531	112	102	1,124	0	5
Total	622,366	157	675	5,539	0	5

Building Energy Consumption = 95,311 (Btu/Sq Ft/Year)
Source Energy Consumption = 250,003 (Btu/Sq Ft/Year)

Floor Area = 28,806 (Sq Ft)

2 EQ5001

CHILLED WATER PUMP C.V.

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION ------

													· *	
Ref Num		Jan	Feb	Mar	Apr	Mon May	thly Con June	sumption July	Aug	Sep	Oct	Nov	· Dec	Total
0	LIGHTS ELEC PK	15067 33.0	13609 33.0	15067 33.0	14581 33.0	15067 33.0	14581 33.0	15067 33.0	15067 33.0	14581 33.0	15067 33.0	14581 33.0	15067 33.0	177,399 33.0
	MISC LD ELEC PK	7412 14.1	6694 14.1	7412 14.1	7173 14.1	7412 14.1	7173 14.1	7412 14.1	7412 14.1	7173 14.1	7412 14.1	7173 14.1	7412 14.1	87,266 14.1
2	MISC LD GAS PK	0.0	0.0	0	0.0	0	0.0	0.0	0	0.0	. 0	0.0	0.0	0.0
3	MISC LD OIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD P HOTH20 PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD P CHILL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
1	EQ1161 ELEC PK	0.0	AIR- 0 0.0	CLD CONS 0 0.0	0.0 CCMP (1 0 0.0	.5 TONS . 0 . 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
1	EQ5200 ELEC PK	0.0	CONE 0 0.0	ENSER FA 0 0.0	ANS 0 0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0	0.0
1	EQ5303 ELEC PK	0.0	CONT 0 0.0	ROLS 0 0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ1100S ELEC PK	0.0	AIR- 0 0.0	CLD RECI 0 20.2	IP 25-45 237 20.2	TONS 1090 22.1	4791 26.1	9463 30.8	5257 26.5	1415 22.5	809 20.2	50 20.2	0	23,111 30.8
2	EQ5200 Elec PK	0.0	CONE 0 0.0	DENSER FA 0 0.1	ANS 9	75 0.9	336 2.1	711 2.7	368 2.1	96 1.6	35 0.7	2	0.0	1,631 2.7
														•

			ditioning Ed tomer Direct		Network											V 600 Page	90
_			RGY CONSUMPT & CAULKING	TION - AL	TERNATIVE	3											
		ELEC PK	0.0	0.0	3.0	343 3.0	898 3.0	1330 3.0	1572 3.0	1387 3.0	984 3.0	740 3.0	89 3.0	0.0	. 1	7,344 3.0	
	2	EQ5303		CONT	ROLS										en de la companya de La companya de la co		:
		PK PK	0.0	0.0	0.3	<b>3</b> 5 0.3	90 0.3	134	158 0.3	139 0.3	99 0.3	74 0.3	9 0.3	0.0		739	
	3	EQ1281		TRAN	E HT-PMP	W-DEMAN	D DEFROS	ST									
		ELEC	1054	<b>9</b> 56	1027	886	0	86	317	84	0	624	1021	1005	٠.	7,062	
		PK .	2.2	2.2	2.2	2.2	0.0	1.2	1.8	1.2	0.7	2.2	2.2	2.2		2.2	
		EQ5215			ENSER FAI											سفس	
		PK	0 0.0	0.0	0.0	0.0	0.0	13 0.2	47 0.3	13 0.2	0 0.1	0 0.0	0.0	0.0		73 0.3	
	_	F0F744		ODUT.	DC: D							*					
	3	EQ5308 ELEC	59	CONT: 53	8015 53	51	0	18	37	20	0	. 42	51	56		441	
		PK	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1	
	3	EQ5350		HEAT	PUMP DEN	IANO DEF	ROST CYC	CLE								·	
		ELEC	14	12	7	0	0	0	0	0 0.0	0.0	0.0	6 0.0	14 0.0		53 0.0	
		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
	4	EQ1281	1077		E HT-PMP 2085			8T 281	000	344	26	778	1667	2001	,	2,847	
		ELEC PK	1973 4.4	1761 4.4	4.4	1124 4.4	0 0.5	2.4	808 3.5	2.5	.1.9	4.4	4.4	4.4	1	4.4	
		EQ5215		na sa	ENSER FAR	19											
	4	ELEC	0	Û	0	0	Ō	42	121	52	4	0	0	. 0		219	
		PK	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.4	0.3	0.1	0.0	0.0		0.5	
		EQ5308		CONT													
1 . 1 %		PK	56 <b>0.1</b>	50 <b>0.</b> 1	53 0.1	37 0.1	0.1	26 0.1	50 0.1	30 <b>0</b> .1	10 <b>0.</b> 1	24 0.1	49 0.1	53 0.1		439 0.1	
٠.			V.1						V.1	0.1	0.1	V.1	V.1	V.1		V.1	
	4	EQ5350 ELEC	28	HEAT 24	POMP DEN	IANO DEF . 0		CLE O	. 0	0	0	0	12	28		107	
		PK	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
	5	EQ1101L		HR A	IR-CLD RE	CIP 515	PROT										
		ELEC	0	0	0	0	229	1279	3311	1357	201	0	0	0		6,378	
		PK	0.0	0.0	0.0	0.0	22.4	23.2	24.0	23.3	22.5	0.0	0.0	0.0		24.0	
	5	EQ5200			ENSER FAN												
		ELEC PK	0 0.0	0 0.0	0.0	0.0	20 0.8	109 1.0	277 1.4	115 1.0	17 1.0	0.0	0.0	0.0		538 1.4	
			• • •					1.0	A17	1.0		•••	•••			•••	
	5	EQ5001 ELEC	0	CHIL	LED WATER 0	PUMP C O	.V. 262	626	1110	728	254	0	0	0		2,980	
		PK	0.0	0.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	0.0	0.0		3.0	
	ς	EQ5303		CONT	ROLS												
	J	ELEC	0	0	0	0	26	63	112	73	26	0	0	. 0		300	
		PΚ	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0		0.3	
	1	EQ4003		FC C	ENTRIF. F	AN C.V.											

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

WEAT	THERSTRIP	& CAULKING												2. 25
	ELEC	0	0	0	0	0	0	. 0	0	0	0	0	0	0
	PK	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.					,				
	ELEC	650	587		629	650	629	650	650	629	650	629	650	7,649
	PK	1.2	1.2		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	10	9	10	10	10	10	10	10	10	10	10	10	120
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.				٠					<b>S</b>
	ELEC	5	4		4	5	4	5	5	4	5	4	5	. 53
	PK .	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	. 0.0
4	EQ4003		FC	CENTRIF.	FAN C.V.				-					
	ELEC	944	853	944	914	944	914	944	944	914	944	914	944	11,114
	PK	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
5	EQ4003		FC		FAN C.V.									
	ELEC	. 0	0		147	115	155	190	166	123	177	97	2	1,211
	PK	0.1	0.0	0.3	8.0	0.6	0.6	0.7	0.6	0.6	0.8	0.7	0.2	0.8
6	EQ4003				FAN C.V.									
	ELEC	1346	1216		1302	1346	1302	1346	1346	1302	1346	1302	1346	15,847
	PK	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
6	EQ4003	.*	FC	CENTRIF.	FAN C.V.									
	ELEC	45	43	46	43	54	47	45	47	47	40	41	42	537
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0	0.1	0.1	0.1
6	EQ4003		FC	CENTRIF.	FAN C.V.									•
•	-ELEC	45	41	45	44	45	44	45	45	44	45	44	45	531
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	- 0.1	0.1	0.1	0.1	0.1
8	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	447	403		432	447	432	447	447	432	447	432	447	5,258
	PK	0.8	0.8	0.8	0.8	8.0	8.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8
9	EQ4003		FC	CENTRIF.	FAN C.V.							•		
	ELEC	45			44	45	44	45	45		45	44	45	531
,	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	, <b>0.1</b> , :.
10	EQ4003		FC		FAN C.V.									
	ELEC		196		210	217	210	217	217	210	217	210		2,550
	PK	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11	EQ4003				FAN C.V.			•	•				·	
	ELEC	5007	4523		4846		4846	5007	5007	4846	5007	4846	5007	<b>5</b> 8,957
	PK	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
12	EQ4003				FAN C.V.									•
	ELEC	11368						11368	11368	11001	11368			
	PK	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
				,										

FC CENTRIF. FAN C.V.

12 EQ4003

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

	ELEC	1025	926	1025	992	1025	992	1025	1025	992	1025	992	1025	12,070
	PK	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
13	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	9	8	9	. 9	9	9	. 9	9	9	9	9	9	106
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								
	P HOTH20	1383	1401	809	259	0	0	0	0	0	127	436	1124	5,539
	PK	5.2	5.2	5.2	4.6	0.0	0.0	0.0	0.0	0.0	3.4	4.8	5.2	5.2
1	EQ5020		HEAT	WATER C	IRC. PUM	IP C.V.								
	ELEC	497	448	497	170	0	0	0	0	0	114	226	497	2,448
	PK	0.9	0.9	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.9	.0.9
2	EQ2261		ELEC	TRIC RAD	IATION									
	ELEC	8795	7944	6241	3062	0	0	0	0	.0	1974	4250	8219	40,485
	PK	16.7	16.7	16.7	16.7	0.0	0.0	0.0	0.0	0.0	16.7	16.7	16.7	16.7
3	EQ2101		PURC	HASED DI	STRICT S	STEAM								
	P STEAM	102	92	102	99	0	0	0	0	0	77	99	102	675
	PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4
3	EQ5020		HEAT	WATER C	IRC. PUM	IP C.V.								
	ELEC	6	6	6	6	0	0	0	0	0	5	6	6	. 40
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5061		COND	ENSATE R	ETURN PU	IMP								
	ELEC	12	11	12	12	0	0	Û	0	0	9	12	12	
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

-	U	T	Ι	L	I	T	Υ	ρ	Ε	A	K	C	Н	Ε	C	K	S	U	М	S	
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

		OTIEIT TEAR	0 11 2 0	2 K U V 11	,
Utility	ELECTRIC DE	MANO	•		
	a 157.1 me of Peak	(kW) 17 (hr) 7 (mo)			
Hour 17	Month 7				
	Equipment Code Name	Equipment Description		Of Tot	
Cooling E	quipment				
2 3 4 5	EQ1281 EQ1281	AIR-CLD RECIP 25-45 TONS TRANE HT-PMP W-DEMAND DEFROST TRANE HT-PMP W-DEMAND DEFROST HR AIR-CLD RECIP >15 TONS	35.6 1.8 3.7 28.1	1.17 2.36	
Sub Total	•		69.3	44.10	
Sub Total			0.0	0.00	
Air Moving	g Equipment				
1 3 4 5 6 8 9 10 11 12		SUMMATION OF FAN ELECTRICAL DEMAND	0.0 1.3 1.8 0.6 2.7 0.8 0.1 0.4 9.5 23.5	0.80 1.14 0.41 1.74 0.54 0.05 0.26 6.05 14.97	
Sub Total			40.8	25.98	
Sub Total			0.0	0.00	
Miscellane	eous				
Lights Base Util Misc Equi Sub Total			33.0 0.0 14.1 47.0	20.97 0.00 8.95 29.93	
Grand Tota	al		157.1	100.00	

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 313

Summer Ground Relectance:

Winter Ground Relectance:

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F)

0.20

. 0.20

 Air Density:
 0.0742 (Lbm/cuft)

 Air Specific Heat:
 0.2444 (8tu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 20:16:38 2/ 1/94
Dataset Name: C8313 .TM

AIRFLOW - ALTERNATIVE 4 COMBINED ECOS

----- S Y S T E M S U M M A R Y ------(Design Airflow Quantities)

		~~~~~~~~~~~		Main			Auxil.	Room
		Outside	Cooling	Heating	Return	Exhaust	Supply	Exhaust
System	System	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow
Number	Туре	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)
1	PTAC	0	0	0	0	0	0	0
2	RAD	0	0	0	0	883	0	0
3	SZ	450	1,600	1,600	2,099	949	0	200
	SZ	235	2,325	2,325	2,798	708	0	0
	VAV	916	916	0	1,067	1,067	0	0
	SZ	1,600	3,315	3,315	3,731	2,016	0	1,000
	SZ	5,220	5,220	5,220	5,220	5,220	0	5,220
8	SZ	110	1,100	1,100	1,302	312	0	0
	SZ	360	1,000	1,000	1,198	558	0	0
10	SZ	780	2,400	2,400	2,638	1,018	0	0
11	SZ	5,040	11,100	11,100	11,100	5,040	0	0
12	SZ	14,400	18,000	18,000	18,178	14.578	0	15,150
13	FC .	0	200	200	200	0	0	0
14	RAD	0	0	0	O	2,177	0	0
Totals		29,111	47,176	46,260	49,531	34,525	0	21,570

CAPACITY - ALTERNATIVE 4
COMBINED ECDS

------ S Y S T E M S U M M A R Y ------ (Design Capacity Quantities)

			Coo	ling					Heating			
		Main Sys.		Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(8tuh)	(Btuh)	(Btuh)	(8tuh)	(8tuh)	(Btuh)	(Btuh)
1	PTAC	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
2	RAD	0.0	0.0	0.0	0.0	-85,687	0	0	0	0	0	-85,687
3	SZ	3.5	0.0	0.0	3.5	-43,950	0	-20,273	0	0	0	-43,950
4	SZ	3.1	0.0	0.0	3.1	-43,482	0	-8,695	0	0	0	-43,482
- 5	VAV	4.1	0.0	0.0	4.1	-16,949	0	-49,245	0	0	0	-66,194
6	SZ	5.3	0.0	0.0	5.3	-37,969	0	-111,537	0	0	0	-37,969
7	SZ	18.8	0.0	0.0	18.8	-280	0	-403,238	0	0	0	-280
8	SI	1.6	0.0	0.0	1.6	-18,570	0	-2,264	0	0	0	-18,570
9	SZ	1.7	0.0	0.0	1.7	-19,268	0	-22,997	. 0	0	0	-19,268
10	SZ	3.0	0.0	0.0	3.0	-22,672	0	-55,371	0	0	0	-22,672
11	SI	11.0	0.0	0.0	11.0	-1,208	0	-395,931	0	0	0	-1,208
12	SZ	36.5	0.0	0.0	36.5	-18,576	0	-1,047,061	0	0	0	-18,576
13	FC	0.0	0.0	0.0	0.0	-116	0	-1,117	0	0	0	-116
14	RAD	0.0	0.0	0.0	0.0	-202,853	0	0	0	0	0	-202,853
Totals		88.6	0.0	0.0	88.6	-511,579	0	-2,117,729	. 0	0	0	-560,824

The building peaked at hour 14 month 7 with a capacity of 88.6 tons

ENGINEERING CHECKS - ALTERNATIVE 4 COMBINED ECOS

----- ENGINEERING CHECKS-----

			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	\1ou	Sq Ft	Sc Ft	Sq Ft	Sq Ft
1	Main	PTAC	0.00	0.00	1,088.5	*****	0.00	0.00	0.00	1,073
2	Main	RAD	0.00	0.00.	0.0	0.0	0.00	0.00	-30.00	2,856
3	Main	SI	28.13	1.18	451.4	382.0	31.42	1.18	-32.46	1,354
4	Main	SZ	10.11	1.84	759.4	413.5	29.02	1.84	-34.35	1,266
5	Main	VAV	100.00	0.52	223.4	426.5	28.14	0.00	-37.87	1,748
6	Main	SZ	48.27	2.12	620.5	292.7	40.99	2.12	-24.28	1,564
7	Main	SZ	99.99	11.13	278.3	25.0	479.87	11.13	-0.60	469
8	Main	SZ	10.00	1.03	700.0	-681.5	17.61	1.03	-17.34	1,071
9	Main	SZ	36.00	1.84	591.0	321.5	37.33	1.84	-35.42	544
10	Main	SZ	32.50	1.56	791.1	506.7	23.68	1.56	-14.75	1,537
11	Main	S2	45.41	2.63	1,012.0	385.0	31.17	2.63	-0.29	4,223
12	Main	SI	. 80.00	9.16	493.1	53.9	222.81	9.16	-9.45	1,966
13	Main	FC	0.00	3.92	4,658.1	1,187.8	10.10	3.92	-2.28	51
14	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-22.33	9,084

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

Net Percnt * Space Percnt * Space Peak Coil Peak Space Ret. Air Ret. Air Percnt Sens.+Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot Sens Of Tot Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (\$) * (Btuh) (Btuh) (\$) * (Btuh) (Btu (Btuh)

0 0

Roof Cond 0 0

Roof Cond 0 0

Glass Solar 0 0

Glass Cond 0 0

Wall Cond 0 0

Partition 0

Exposed Floor 0

Infiltration
Sub Iotal (8tuh) (%) * (8tuh) (%) * (8tuh) (8tuh) (%)

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0.00

0 0.00 * 0 0.00 * 0 0 0.00

0 0.00 * 0 0.00 * 0 0 0.00

0 97.45 * 0 100.00 * 0 0 104.25

0 97.45 * 0 100.00 * 0 0 104.25 0 0.00 0 0 Sub Total==> Internal Loads Lights 0 0
People 0
Misc 0 0 0.00 * 0 0.00 0 0.00 0 0.00 Sub Total==> 0
Ceiling Load 0
Outside Air 0 0 0.00 0 0.00 0 0.00 . 0 -4.25 0 0.00 0 0.00 0 0.00 0 0.00 0 2.55 * 0.00 * 0.00 * 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 -4.25 ó.00 * 0 2.55 * Sup. Fan Heat Ret. Fan Heat Duct Heat Pkup OV/UNDR Sizing 0
Exhaust Heat 0
Terminal Bypass 0 Terminal Bypass * * Grand Total==> 0 0 0 0 100.00 * 0 100.00 * 0 100.00 Total Capacity Sens Cap. Coil Airfl Entering D8/W8/HR Leaving D8/W8/HR Gross Total Glass (sf) (%)
(Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 1,073
 Main Clg
 0.0
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 0.0
 0. Part 0 ExFlr 0
Roof 0
Wall 0 0 (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.00 SADB 28.0 38.1

System 2 Block RAD - RADIATION

*****			ITOO OUT 100	NEAU ++++	****	*****	. * * * * *	****	COACE	DEAV ++++	******	77110 0071	0514	
	# **** ******** at Time ==>		Mo/Hr:		*****	****	*			0/0 *		Mo/Hr: 1		*******
	at Time/				0		*		ADB:	0 *		DADB:		
0015100	5 HII **/	Ųń	100 110 1111.	0, 0, 0,	·		*		100.	*		UNDU.	•	
		Space	Ret Air	Ret. Air	Net	Percr	ıt *	S	pace	Percnt *	Space Pe	eak Coil	Deak	Percnt
	Ser	ns.+Lat.	Sensible		Total					Of Tot *	-			Of Tot
Envelo		(Stuh)		(Btuh)	(Btuh)		;) *	(8		(%) *				(%)
	ite Solr	0	0		0		10 *	(5	0	0.00 *	-	0	0	0.00
		0	0		0		0 *		0	0.00 *		0	0	0.00
Roof		0	0		0		0 *		0	0.00 *		250 -4	,950	5.78
	Solar	0	0		0		0 *		0	0.00 *			. 0	0.00
	Cond	0	0		0		0 *		0	0.00 *			,004	12.84
Wall		0	0		0		0 *		0	0.00 *		345 -7		
. Parti		0	•		. 0		0 *		Ō	0.00 *			-885	1.03
	ed Floor	0			0		10 *		0	0.00 *			0	0.00
	tration	0			0		0 *		. 0	0.00 *		503 -61		
	otal==>	0	0		0		10 *		0	0.00 *		887 -8 5	-	
	l Loads	V	v		v	0.0	*		•	*			,	203100
Light		0	0		0	0.0	0 *		0	0.00 *		0	0	0.00
Peopl		0	v		0		0 *		0	0.00 *		0	Ō	0.00
Misc	-	0	0	0	0		0 *		0	0.00 *		0	Ō	0.00
	otal==>	0	0	0	0		0 *		0	0.00 *		0	ō	0.00
Ceiling		Ò	0		0		0 *		0	0.00 *		0	0	0.00
Outside		0	0	0	0		0 *		0	0.00 *		0	0	0.00
Sup. Fa					0		0 *			0.00 *			0	0.00
Ret. Fa			0		0	0.0	0 *			0.00 *			0	0.00
	at Pkup		0		0	0.0	0 #			0.00 *			0	0.00
	Sizing	0			0	0.0	0 *		0	0.00 *		0	0	0.00
Exhaust	-		, 0	0	0	0.0	0 *			0.00 *			0	0.00
Termina	l Bypass		0	0	0	0.0	0 *			0.00 *			0	0.00
							*			*				
Grand T	otal==>	0	0	0	0	0.0	0 *		0	0.00 *	-85,6	87 -85	,687	100.00
140														
			0001					~~~~~				AREAS-		
			Sens Cap.							3/W8/HR	Gross Tot	al Gla	ss (si	f) (%)
			(Mbh)								Floor			
	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0		342		
Aux Clg		0.0	0.0	0.		0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent		0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	2,153		0 0
Totals	0.0	0.0									Wall	2,453	3	305 12
			ECTION		AIF					NGINEERING		TEMPER		
	Capacity	Coil A				Coolin	-	Heating		; % OA	0.0	Type	Clg	•
	(Mbh)	(cf	-	Deg F	Vent		0	0		Cfm/Sqft	0.00	SAD8	0.0	
Main Htg			0.0	0.0	Infil	-	0	883		cfm/Ton	0.00	Plenum	0.0	
Aux Htg			0 0.0	0.0	Supply		0	0		Sqft/Ton	0.00	Return	0.0	
Preheat	0.0		0 0.0	0.0	Mincfm		0	0		Btuh/Sqft		Ret/OA	0.0	
Reheat	0.0		0. 0.0	0.0	Return		0	0		. People	0	Runarnd	0.0	
Humidif	0.0		0.0	0.0	Exhaust		0	. 0		3 % OA	0.0	Fn MtrTD		
Opt Vent			0 0.0	0.0	Rm Exh		0	0		g Cfm/SqFt	0.00	Fn BldTD	,	
Total	-85.7				Auxil		0	0	Ht	g Btuh/SqFt	-30.00	Fn Frict	0.0	0.0

System 3	1 Ak Percnt (%) 0 0.00 0.00 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.
Peaked at Time ==> Mo/Hr: 7/14	1 Ak Percnt (%) 0 0.00 0.00 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.
Outside Air ==> CADE/WS/MR: 91/ 74/105.0	Ak Percnt (%) 0 0.00 0 0.00 0 0.00 0 1.15 0 0.00 0 0.00 0 79.07
Space	ns Of Tot (%) 0 0.00 0 0.00 22 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Space Ret. Air Ret. Air Net Percht Space Percht Space Percht Space Peak Coil Ret. Air Sens. Latent Total Of Tot Sens. Sens. Space Sp	ns Of Tot (%) 0 0.00 0 0.00 22 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Envelope Loads	ns Of Tot (%) 0 0.00 0 0.00 22 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Envelope Loads (8tuh) (8tuh) (8tuh) (\$) * (8tuh) (\$) * (8tuh) (\$) * (8tuh) (\$) \$ Skylite Solr 0 0 0 0 0.00 * 0	(%) 0 0.00 0 0.00 92 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Skylite Solr 0 <t< td=""><td>0 0.00 0 0.00 92 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07</td></t<>	0 0.00 0 0.00 92 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Skylite Cond 0 0 0 0.00 * 0 0.00 * 0 Ros 0 Ros 0 0.00 * 0 <td>0 0.00 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07</td>	0 0.00 8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Skylite Cond 0 0 0 0.00 * 0 0.00 * 0 Rose Condition * 0 0.00 * 0 Rose 0 Rose 3,507 8.25 * 4,332 20.43 * -3,592 -3,692 -3,692 -3,692 -3,692 -3,692 -3,692 -3,693 -3,692 -3,693 -3,692 -3,693 -3,693 -3,693 -3,693 -3,693 -3,692 -3,693 -3,693 -3,792 -3,792 -3,792 -3,792 -3,792 -3,750 -3,775 -5,700 -5,700 -5,700 -5,700 -5,700 -5,700 -5,710 -5,700 -5,700 -5,700 -5,700 -5,700 -5,700 -5,700 -5,710 -5,700	8.17 0 0.00 07 1.15 00 11.61 0 0.00 0 0.00 79.07
Glass Solar 408 0 408 0.96 * 310 1.46 * 0 Glass Cond 101 0 101 0.24 * 104 0.49 * -507 7 Mall Cond 2,526 0 2,526 5.94 * 2,710 12.78 * -5,100 -5, Partition 0 0 0.00 * 0 0.00 * 0 Exposed Floor 0 0 0.00 * 0 0.00 * 0 Infiltration 15,152 15,152 35.62 * 7,710 36.36 * -34,750 -34, Sub Total==> 21,695 0 21,695 51.00 * 15,166 71.51 * -43,950 -43, Internal Loads Lights 4,429 0 4,429 10.41 * 5,365 25.30 * 0 People 700 700 1.65 * 677 3.19 * 0 Misc 0 0 0 0 0 0.00 * 0 0.00 * 0 Sub Total==> 5,129 0 0 5,129 12.06 * 6,042 28.49 * 0 Ceiling Load 0 0 0 0 0.00 * 0 0.00 * 0 Outside Air 0 0 0 13,665 32.12 * 0 0.00 * 0 Sub, Fan Heat 0 0 0 0.00 * 0.00 * 0.00 * Ret. Fan Heat 0 0 0 0.00 * 0.00 * 0 Dut Heat Pkub 0 0 0 0.00 * 0.00 * 0 Exhaust Heat 0 0 0 0.00 * 0.00 * 0 Exhaust Heat 0 0 0 0.00 * 0.00 * 0 Exhaust Heat 0 0 0 0.00 * 0.00 * 0.00 * 0 Exhaust Heat 0 0 0 0 0.00 * 0.00 * 0.00 * 0 Terminal Bypass 0 0 0 0 0.00 * 0.00 *	0 0.00 7 1.15 90 11.61 0 0.00 0 0.00 79.07
Glass Solar 408 0 408 0.96 * 310 1.46 * 0 Glass Cond 101 0 101 0.24 * 104 0.49 * -507 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	07 1.15 00 11.61 0 0.00 0 0.00 50 79.07
Glass Cond 101 0 101 0.24 * 104 0.49 * -507 7 7 8 8 101	00 11.61 0 0.00 0 0.00 50 79.07
Wall Cond 2,526 0 2,526 5.94 2,710 12.78 * -5,100 -5, 100 -5, 100 -5, 100 -5, 100 -5, 100 -5, 100 * 0 0.00 * 0 0	0 0.00 0 0.00 50 79.07
Partition 0 0 0.00 * 0 0.00 * 0 Exposed Floor 0 0 0.00 * 0 0.00 * 0 Infiltration 15,152 15,152 35.62 * 7,710 36.36 * -34,750 -34, Sub Total==> 21,695 0 21,695 51.00 * 15,166 71.51 * -43,950 -43, Internal Loads * * * * * * * * -43,950 -43, Internal Loads *	0 0.00 50 79.07
Exposed Floor 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0.00 * 0 0.00	79.07
Infiltration 15,152	
Sub Total==> 21,695 0	
Internal Loads	50 100.00
Lights 4,429 0 4,429 10.41 * 5,365 25.30 * 0 People 700 700 1.65 * 677 3.19 * 0 Misc 0 0 0 0.00 * 0 0.00 * 0 Sub Total==> 5,129 0 0 5,129 12.06 * 6,042 28.49 * 0 Ceiling Load 0 0 0 0.00 * 0 0.00 * 0 Outside Air 0 0 0 13,665 32.12 * 0 0.00 * 0 Sup. Fan Heat 0 0 0.00 * 0.00 * 0.00 * Ret. Fan Heat 0 0 0.00 * 0.00 * 0 OV/UNDR Sizing 0 0 0.00 * 0 0.00 * 0 Exhaust Heat 0 0 0 0.00 * 0.00 * Terminal Bypas	
People Misc 700 1.65 * 677 3.19 * 0 Misc 0 0 0 0.00 * 0 0.30 * 0 Sub Total==> 5,129 0 0 5,129 12.06 * 6,042 28.49 * 0 Ceiling Load 0 0 0 0.00 * 0.00 * 0 Outside Air 0 0 0 13,665 32.12 * 0 0.00 * 0 Sup. Fan Heat 2,048 4.81 * 0.00	0 0.00
Misc 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0.00
Sub Total==> 5,129 0 0 5,129 12.06 * 6,042 28.49 * 0 0 Ceiling Load 0 0 0 0.00 * 0 0.00 * 0 0	0 0.00
Ceiling Load 0 0 0 0.00 * 0 0.00 * 0 Outside Air 0 0 0 13,665 32.12 * 0 0.00 * 0 Sup. Fan Heat 2,048 4.81 * 0.00 *	0.00
Outside Air 0 0 0 13,665 32.12 * 0 0.00 * 0 Sup. Fan Heat 2,048 4.81 * 0.00 * 0.00 * Ret. Fan Heat 0 0 0.00 * 0.00 * Duct Heat Pkup 0 0 0.00 * 0.00 * OV/UNDR Sizing 0 0 0.00 * 0.00 * Exhaust Heat 0 0 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 *	0 0.00
Sup. Fan Heat 2,048 4.81 * 0.00 * Ret. Fan Heat 0 0.00 * 0.00 * Duct Heat Pkup 0 0.00 * 0.00 * OV/UNDR Sizing 0 0.00 * 0.00 * Exhaust Heat 0 0 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 *	0 0.00
Ret. Fan Heat 0 0 0.00 * 0.00 * Duct Heat Pkup 0 0 0.00 * 0.00 * OV/UNDR Sizing 0 0 0.00 * 0.00 * Exhaust Heat 0 0 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 * * * * *	0 0.00
Duct Heat Pkup 0 0 0.00 * 0.00 * OV/UNDR Sizing 0 0 0.00 * 0 0.00 * Exhaust Heat 0 0 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 * * * *	0.00
OV/UNDR Sizing 0 0 0.00 * 0 0.00 * 0 Exhaust Heat 0 0 0 0.00 * 0.00 * Terminal Bypass 0 0 0.00 * 0.00 * * * *	0 0.00
Exhaust Heat 0 0 0 0.00 * 0.00 * 0.00 * Terminal Bypass 0 0 0 0.00 * 0.00 * * * * *	0 -0.00
Terminal Bypass 0 0 0 0.00 * 0.00 * *	0 0.00
	0 0.00
Grand 10ta17 20,023 0 0 42,337 100.00 4 21,200 100.00 4 43,730 43,	50 100.00
	(() (0)
	(sf) (%)
(Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 1,354	
Main Clg 3.5 42.5 29.4 1,600 79.4 68.7 90.8 61.6 60.8 80.4 Part 0	•
Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0	Λ Λ
Opt Vent 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 1,354	0 0
Totals 3.5 42.5 Wall 1,386	14 1
	JRES (F)
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 28.1 Type	Clg Htg
(Mbh) (cfm) Deg F Deg F Vent 450 0 Clg Cfm/Sqft 1.18 SADB	52.8 93.2
Main Htg -43.9 1,600 68.0 93.2 Infil 499 499 Clg Cfm/Ton 451.37 Plenum	75.0 68.0
Aux Htg 0.0 0 0.0 0.0 Supply 1,600 1,600 Clg Sqft/Tcn 381.97 Return	75.0 68.0
Preheat -20.3 1,600 50.0 61.6 Mincfm 0 0 Clg Btuh/Sqft 31.42 Ret/DA	79.4 68.0
Reheat 0.0 0. 0.0 0.0 Return 1,600 1,600 No. People 9 Runarnd	75.0 68.0
Humidif 0.0 0 0.0 0.0 Exhaust 450 0 Htg % OA 0.0 Fn MtrTD	0.3 0.0
Opt Vent 0.0 0 0.0 0.0 Rm Exh 200 0 Htg Cfm/SqFt 1.18 Fn 8ldTD	0.2 0.0
Opt Vent 0.0 0 0.0 0.0 Rm Exh 200 0 Htg Cfm/SqFt 1.18 Fn BldTD Total -43.9 Auxil 0 Htg Btuh/SqFt -32.46 Fn Frict	

System 4 Peak SZ - SINGLE ZONE

* Mo/Hr: 7/17 * Mo/Hr: 13/ 1 Peaked at Time ==> Mo/Hr: 7/14 Outside Air ==> OADE/#8/HR: 91/ 74/105.0 OAD8: 89 OADB: 4 | Space | Ret. Air | Ret. Air | Net | Percnt | * Space | Percnt | * Sp Net Percht * Space Percht * Space Peak Coil Peak Percht Space Ret. Air Ret. Air Infiltration 15.577
Sub Total==> 22,381 0 22,381 60.92 * 16,875 75.01 ...

Internal Loads
Lights 4,025 0 4,025 10.96 * 4,900 21.87 * 0 People 703 1.91 * 633 2.83 * 0 Misc 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 Sub Total==> 4,727 0 0 4,727 12.87 * 5,533 24.69 * 0 Ceiling Load 0 0 0 0 0.00 * 0 0 0.00 Lights 0 0.00 0 0.00 0 0.00 0 0.00 0.00 * 0.00 * 0.00 * 0 -0.00 * 0 0.00 Duct Heat Pkup 0

OV/UNDR Sizing 0

Exhaust Heat 7

Terminal Bypass 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 * 0 0.00 *

 OV/UNDR Sizing
 0
 0 -0.00 *
 0

 Exhaust Heat
 0
 0
 0 0.00 *

 Terminal Bypass
 0
 0
 0.00 *

 0.00 * 0.00 * Grand Total==> 27,108 0 0 36,740 100.00 * 22,406 100.00 * -43,482 -43,482 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 1,266 Main Clg 3.1 36.7 28.3 2,325 76.6 67.6 90.0 65.0 63.0 85.5 Part 0 0 0.0 0.0 0.0 0.0 0.0 0.0 Aux Clg 0.0 0.0 0.0 0.0 Opt Vent 0.0 0.0 0 ExFlr Roof 1,266 0 0 Wall 1,314 71 5 0 0.0 0.0 · 0.0 0.0 0.0 0.0 Totals 3.1 36.7 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 10.1 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 235 0 Clg Cfm/Sqft 1.84 SADB 66.1 85.2 Main Htg -43.5 2,325 68.0 85.2 Infil Aux Htg 0.0 0 0.0 0.0 Supply Preheat Reheat Humidif Opt Vent 0.0 Total -43.5

System 5 Block VAV - VARIABLE AIR VOLUME

System	3	DIUCK	101	THILITOL	L AIN YOUUIL	•					0
					******			PACE PEAK ***			******
	t Time ==>		Mo/Hr:	•		*		r: 7/18	*	Mo/Hr: 13/ 1	
Outside #	Air ==>	QΑ	DS/W8/P9:	91/ 74/105.	0	*	OAC	8: 87	*	OADB: 4	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						*			*		
		Space		Ret. Air		Percnt *					Percnt
		ns.+Lat.	Sensible		Total				•		Of Tot
Envelope		(Btuh)	(ātuh)	(Btuh)	(Btuh)	(%) *			* (8tuh		(\$)
Skylite		0	0		0	0.00 *		0.00		0 0	0.00
Skylite		0	0		0	0.00 *		0 0.00		0 0	0.00
Roof Co			0		0	0.00 *		0 0.00		0 0	0.00
Glass		4,737	0		4,737	9.63 *				0 0	0.00
Glass (1,101	0		1,101	2.24 *					32.48
Wall Co		207	24		231	0.47 *		20 1.09			5.39
Partit		0			0	0.00 *		0.00		0 0	0.00
•	d Floor	Q.			0	0.00 *		0 0.00		0 0	0.00
Infilt		6.531			6,531	13.28 *			•		62.13
Sub To		12,576	24		12,600	25.62 *	•		,	3 -16,949	100.00
Internal						*		•	*		
Lights		5,718	0		5,718	11.63 *	•			0 0	0.00
People		904			904	1.84 *		91 4.91		0 0	0.00
Misc		Ū	0		0	0.00 *		0 0.00		0 0	0.00
Sub Tot		6,622	0	0	6,622	13.46 *	,			0	0.00
Ceiling !		3	-3		0	0.00 *		9 0.05			0.00
Outside A		9	0	0	29,009	58.98 *		0.00		0	0.00
Sup. Fan					955	1.94 *		0.00		0	0.00
Ret. Fan			-	•	0	0.00 *		0.00		0	0.00
Duct Heat			0		0	0.00 *		0.00		0	0.00
OV/UNDR S	-	0		^	0	0.00 *		0.00		0	0.00
Exhaust			, -4		- 4	-0.01 *		0.00		0	0.00
Terminal	bypass		0	0	0	-0.00 *		0.00	*	0	0.00
Onced Tel	halas	10.001	17	^	47 100	*		04 100 00	+ 17 041	17 040	100.00
Grand Tol	(al==>	19,201	17	0	49,182	100.00 *	20,1	94 100.00	* -16,94	9 -16,949	100.00
				LING COIL S	CLEATION					ADEAG	
	Total C	apacity		Coil Airfl		g DB/WB/HR	Loovi	ng DB/WB/HR	Gross Total	AREAS l Glass (s	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfn)		y bo/wo/nk F Grains		eg F Grains		1,748	(1)
Main Clg	4.1	49.2	27.1	672		.3 105.0	_	52.2 57.9	Part	^	
Aux Clg	0.0	0.0	0.0	0.		.0 0.0	0.0	0.0 0.0	ExFlr	0	•
Opt Vent	0.0	0.0	0.0	0		.0 0.0	0.0	0.0 0.0	Roof	. 0	0 0
Totals	4.1	49.2	V.V	V	0.0 0	.0 0.0	V. 0	V.V V.V	Wall		153 36
ividia	7.1	77.2							71411	420	155 00
	HEATING	COTT SEL	ECTION		AIR	FLOWS (cfm	}	ENGINEERIN	G CHECKS	TEMPERATURE	S (F)
	Capacity					Cooling	Heating	Clg % OA	100.0	Type Clg	
* ***	(Mbh)	(cfi		Deg F	Vent	916	0	Clg Cfm/Sqft		SAD8 54.	
Main Htg	-16.9		0 0.0	0.0	Infil	151	151	Clg Cfm/Ton		Plenum 75.	
_	0.0		0 0.0	0.0	Supply	916	0	Clg Sqft/Ton		Return 75.	
Aux Htg	-49.2		916 4.0	53.4	Mincfm	0	0	Clg Btuh/Sqf		Ret/OA 90.	
Preheat	-0.0		0 0.0	0.0	Return	916	0	No. People	11	Runarnd 75.	
Reheat	-0.0 0.0		0 0.0	0.0	Exhaust	916	- 0	Htg % OA	0.0	Fn MtrTD 0.	
Humidif	0.0		0 0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt		Fn BldTD 0.	
Opt Vent	-66.2		v v.v	V.V	Auxil	0	0	Htg 8tuh/SqF		Fn Frict 0.	
Total	-00.2				HWALL	V	V	and organiadi	57.07	V.	, ,,,

System 6 Peak SZ - SINGLE ZONE

Peaked at Time	::>	Mo/Hr:	7/14			* Mo	/Hr:	7/17 *	•	Mo/Hr:	13/ 1	
Outside Air ==>				0		* 0	ADB:	89	!	OADB:	4	
	C	Ont Ain	Ret. Air	Not	Percnt	*	naan	Doront 1	k K Space Pe	ak Cail	Dook	Danant
	Space Sens.+Lat.	Sensible			Of Tot		pace ible	Percnt * Of Tot *			Peak Sens	Percnt Of Tot
	(Btuh)	(Btuh)		(Btuh)	(%)		tuh)	(%)	•		Btuh)	(\$)
•	(5000)			(0.011)	0.00		0	0.00		0	0	0.00
Skylite Solr Skylite Cond	0	0		0	0.00		0	0.00		0	0	0.00
•	0			0	0.00		0	0.00 *		٥	٥	0.00
Roof Cond				5,265	8.21		,850	27.77 *		0	٥	0.00
Glass Solar	5,265	0			1.62		,030	4.89		269 -	5,269	13.88
Glass Cond	1,038 920	97		1,038	1.59		984	4.67 *				9.85
Wall Cond		71		1,017				0.00 *			3,741	
Partition	0			0	0.00		0			-	. 0	0.00
Exposed Floor	0 (53			0 (57	0.00		0	0.00 *		0	0 050	0.00
Infiltration	9,657	07		9,657			,425	30.50 *			8,959	76.27
Sub Total==>	16,880	97		16,977	26.48		,289	67.83 *		12 -3	7,969	100.00
Internal Loads						*	001	. *		^	•	0.00
Lights	4,900	0		4,900	7.64		,981			0	0	0.00
People	861			861	1.34		782	3.71 *		0	0	0.00
Misc	0	0	0	0	0.00		0	0.00 ‡		0	0	0.00
Sub Total==>	5,761	0	0	5,761	8.99		,763	32.10 *		0	0	0.00
Ceiling Load	14			0	0.00		15	0.07 *		43	0	0.00
Outside Air	0	0	0	37,161			0	000 *		0	0	0.00
Sup. Fan Heat				4,243	6.62			0.00 *			0	0.00
Ret. Fan Heat		0		0	0.00			0.00 *			0	0.00
Duct Heat Phup		0		0	0.00			0.00 *			0	0.00
OV/UNDR Sizing	0			0	0.00		0	0.00 *		0	0	0.00
Exhaust Heat		÷31	0	-31	-0.05			0.00 *			0	0.00
Terminal Bypass		0	0	0	0.00			0.00 *			0	0.00
	55 /FF		^	// 110		*	0/7	100.00			7 0/0	100.00
Grand Total==>	22,655	52	0	64,112	100.00	* 21	,067	100.00 *	-3/,6	555 - 3	7,969	100.00
								DB/WB/HR			•	f) (%)
(Tons)	(Mbh)	(Mbh)	(cfm)	D eg F Deg				F Grains				
lain Clg 5.3	64.1		3,315						Part	0		
ux Clg 0.0		0.0	0.		.0 0.		0.0		ExFlr	0		
pt Vent 0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	0		0 0
otals 5.3	64.1								Wall	1,155	1	146 13
HEATI	NG COIL SEL	ECTION		AIR	FLOWS (cf	m)		-ENGINEERING	CHECKS	TEMPE	RATURES	s (F)
Capaci	ty Coil A	irfl Ent	Lvg	Type	Cooling	Heating	C.	lg % OA	48.3	Type	Clg	
(Mbh	*			Vent	1,600	0		lg Cfm/Sqft	2.12	SADB	69.2	_
ain Htg -38	,	315 67.9	_	Infil	416	416		lg Cfm/Ton		Plenum	75.0	
ux Htg 0				Supply		3,315		lg Sqft/Ton		Return	75.0	
reheat -111		315 37.1		Mincfm	0	0		lg Btuh/Sqft		Ret/OA	82.5	
eheat 0		0. 0.0	0.0	Return	2,731	3,315		o. People		Runarnd		
		0 0.0	0.0	Exhaust	1,016	. 0,013		tg % OA		Fn MtrT		
lumiqit u												
Humidif 0 Opt Vent 0		0 0.0	0.0	Rm Exh	1,000	0		tg Cfm/SqFt		Fn 8ldT		

System 7 Peak SZ - SINGLE ZONE

*	******	******	***** CO	CLING COIL	. PEAK ****	******	******	***** CLG	SPACE	PEAK ****	***** HE	ATING COIL	PEAK *	*****
F	eaked at	: Time ==>		Mo/Hr:	7/14			* Mo,	/Hr: 7	7/15 *		Mo/Hr: 1	3/1	
0	Outside A	ir ==>	0 A0	8/W8/HR:	91/ 74/105.)		* 04	ADB: 9	91 *		OADB:	4	
			Canaa	not Air	Ret. Air	No+	Percnt	* *	0000	* Percnt *	Space P	nak Cail	Dook	0
		Co	Space rs.+Lat.	Sensible			Of Tot		pace	Of Tot *	•	eak Coil ens Tot		Perch Of To
,														
t	invelope		(Btuh)	(Btuh)		(Btuh)				(%) *				(\$
	Skylite		0	0		0			0	0.00 *		0	0	0.0
	Skylite		0	(0			0	0.00 *		0	0	0.0
	Roof Co		0	(0			0	0.00 *		0	. 0	0.0
	Glass S		0	(0			.0	0.00 *		0	0	0.0
	Glass C		0	(0			0	0.00 *		0	0	0.0
	Wall Co		0	()	_ 0			0	0.00 *		0	0	0.0
	Partiti		78			78			78	99.95 *			-280	99.9
	Exposed		0			0			0	0.00 *		0	0	0.0
	Infiltr	ation	0			0			0	0.02 *		0	0	0.0
	Sub Tot	:al==>	78	()	78	0.03	*	78	99.97 *	- 1	280	-280	100.0
I	internal	Loads						*		. *				
	Lights		0	()	0	0.00	*	0	0.00 *		0	0	0.0
	People		. 0			0	0.00	*	0	0.00 *		0	. 0	0.0
	Misc		0	0	0	0	0.00	*	Ō	0.00 *		0	0	0.0
	Sub Tot	al==>	0	0) 0	0	0.00	*	0	0.00 *		0	0	0.0
C	eiling L	.oad	0	C)	0	0.00	*	0	0.00 *		0	0	0.0
0	utside A	ir	0	C	0	224,979	99.97	*	0	0.00 *		0	0	0.0
5	Sup. Fan	Heat				0	0.00	*		0.00 *			0	0.0
	let. Fan			C)	Û	0.00	*		0.00 *			0	0.0
	uct Heat			C)	0	0.00	*		0.00 *			0	0.0
	V/UNDR S		0			0	0.00	*	0	0.03 *		0	0	0.0
	xhaust H			, () 0	0	0.00	‡		0.00 *			0	0.0
	erminal			C		0				0.00 *			0	0.0
·	•	-,,,						*		*			-	
G	rand Tot	al==>	78	0) 0	225,057	100.00	*	78	100.00 *		280	-280	100.0
					LING COIL S							AREAS-	-	
1.					Coil Airfl			R Leav					ss (st	(%)
		(Tons)			(cfm)	-		s Deg F			Floor	469		
		18.8			5,220						Part			
	x Clg	0.0	0.0	0.0	0.		0.0 0.		0.0	0.0	ExFlr	. 0		
	t Vent	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0	Roof	0		0
To	tals	18.8	225.1								Wall	0		0
		HEATING	COIL SELE	CTION		AI	RFLOWS (cf	m)		ENGINEERING	CHECKS	TEMPER	ATURES	(F)
		Capacity				Туре	Cooling	Heating		3 % OA	100.0	Type	Clg	Htg
		(Mbh)	(cfm			Vent	5,220	0		Cfm/Sqft	11.13	SADB	75.0	_
Мэ	in Htg	-0.3	5,2			Infil	0	0	_	Cfm/Ton	278.34	Plenum	75.0	
	x Htg	0.0	٠,٠	0 0.0		Supply	5,220	5,220	_	Sqft/Ton	25.01	Return	75.0	
	eheat	-403.2	5,2			Mincfm	0	0,220	_	Btuh/Sqft		Ret/OA	90.5	
	heat	0.0	3,2	0, 0.0		Return	0	5,220		. People	0	Runarnd	75.0	
110	midif	0.0		0 0.0		Exhaust	0	- 0		3 % OA	0.0	Fn MtrTD		
		V.V		v. v. v	V.V	EVIII 02 C	V	V	116	9 70 011	V.V	10 110:10	v.v	
Hu				0 0 0) () ()	8m Evh	5 220	۸	Htr	Cfm/SaFt	11 17	Fn RldTn	Δ Λ	١ ٨
Hu Op	t Vent	0.0 -0.3		0 0.0	0.0	Rm Exh Auxil	5,220 0	0	_	g Cfm/SqFt g Btuh/SqFt	11.13 -0.60	Fn BldTD Fn Frict	-	

System 8 SZ - SINGLE ZONE Peak

*******	** *******	רחחו זאב רחזו	DFAK ****	********	******	*****	SPACE	DFAK ****	****** HFAT	ING COTI DEA	Y ******
Peaked at Tin		Mo/Hr:		ጥ ተስተ ተቀ ቀ ቀ ተ				7/12 *		Mo/Hr: 13/	
Outside Air		AD3/W8/HR: '		0	:			37 *		OADB: 4	•
			,,	•	:	ŧ .		*			
	Space	Ret. Air	Ret. Air	Net	Percht	k S	pace	Percnt *	Space Pea	k Coil Pea	k Percn
	Sens.+Lat.	Sansible	Latent	Total				Of Tot *			
Envelope Load		(Btuh)	(Btuh)	(Btuh)			tuh)	(%) *			
Skylite Sol		1	` '	` 0			Ó	0.00 *	•		0.00
Skylite Cor		0		0			0	0.00 *		0	0 0.0
Roof Cond	0	0		0			0	0.00 *		0	0 0.00
Glass Solar	3,225	0		3,225			,275	34.23 *		0	0 0.0
Glass Cond	532			532			392	3.14 *	-2,70	2 -2,70	-
Wall Cond	545	-		603			507	4.06 *	-	•	
Partition	0	33		- 000			0	0.00 *		_	0 0.00
Exposed flo	•			. 0			0	0.00 *		Ī .	0 0.00
Infiltratio				5,888			,593	20.76 *		•	
Sub Total==		58		10,248			,767	62.19 *	•	-	
Internal Load		30		10,240	34.04		, 101	*		, 10,57	100.0
Lights	3,405	0		3,405	18.06	t 7	,997	32.00 *		0	0 0.00
People	594	v		594			714	5.72 *			0 0.00
Misc	0	0	.0	0			0	0.00 *			0 0.00
Sub Total==	•	0	0	3,999			711	37.72 *		•	0 0.00
	•	-	V	0,777			12	0.10 *	-3	•	0 0.00
Ceiling Load	13	-13	0	3,207			0	0.00 *		_	0 0.00
Outside Air	•			1,408			V	0.00 *	- "	•	0 0.00
Sup. Fan Heat		` ^		. 0				0.00 *			0.00
Ret. Fan Heat		0		. 0				0.00 *			0 0.00
Duct Heat Pku		U		0			0	-0.00 *			0 0.00
OV/UNDR Sizin	g 0	, -5	0	-5			V	0.00 *	,	-	0 0.00
Exhaust Heat			0	0				0.00 *			0 0.00
Terminal Bypa		v	V	V	0.00			*		,	0.00
Grand Total==	14,202	41	. 0	18,858	100.00	12	,490	100.00 *	-1,8,43	5 -18,57	0 100.00
		cnat	ING COIL S	FLECTION	~~~~~~					AREAS	
To	tal Capacity	Sens Cap.			ng D8/W8/H	l Leav	ing DE	B/WB/HR	Gross Tota	-	(sf) (%)
	ns) (Mbh)	(Mbh)	(cfm)	Deg F De	g F Grains	Deg F	Deg F	Grains	Floor	1,071	
	1.6 18.9		1,100		7.4 88.8		62.4	84.9	Part	0	
•	0.0 0.0		0.	0.0	0.0 0.0		0.0	0.0	ExF1r	0	•
•	0.0		0	0.0	0.0 0.0		0.0	0.0	Roof	0	0 (
otals	1.6 18.9								Wall	561	75 13
НЕ	ATING COIL SE	ECTION		AI	RFLOWS (cfa	1)		NGINEERING	CHECKS	TEMPERATU	RES (F)
•	acity Coil			Type	Cooling	Heating		\$ 0A	10.0		lg Htg
		fm) Deg F	Deg F	Vent	110	0	_	Cfm/Sqft	1.03		4.6 83.4
•		,100 67.9	83.4	Infil	202	202		Cfm/Ton			5.0 67.9
		0 0.0	0.0	Supply	1,100	1,100	_	Sqft/Ton	681.51		5.0 67.9
reheat		100 61.5	63.4	Mincfm	0	0	_	Btuh/Sqft			6.6 67.
	0.0	0. 0.0	0.0	Return	1,100	1,100	_	People	7	•	5.0 68.0
eheat	V • V										
			0.0			. 0					
Reheat Humidif Opt Vent	0.0			Exhaust Rm Exh	110 0		Htg	% OA Cfm/SqFt	0.0	Fn MtrTD	0.3 0.0 0.2 0.0

System 9 Peak SZ - SINGLE ZONE

	:=>	Mo/Hr: 7				•	: 7/17		Mo/Hr: 13/ 1	
Outside Air ==>	04	D8/W8/HR: 9	74/105.0	0	3	OADS.	: 89	*	OADB: 4	
.,	Space	Ret. Air	Ret. Air	Net	Percnt	spac	e Percnt	* Space Peak	Coil Peak	Percn
	Sens.+Lat.	Sensible	Latent		Of Tot					
Envelope Loads	(Btuh)	(Btuh)		(Btuh)	(%)					
Skylite Solr	0	0	()	0	0.00					
Skylite Cond	0	0		0	0.00				0	
Roof Cond	1,065	0		1,065					-1,238	
Glass Solar	2,026	0		2,026	9.98			•		0.0
Glass Cond	514	0		514	2.53					
Wall Cond	485	0		485	2.39					
Partition	0	•		. 0	0.00			•		
Exposed Floor	0			0	0.00		0 0.00			
Infiltration	4,979			4,979					-13,790	
Sub Total==>	9,070	0		9,070	44.67	•		•		
nternal Loads	7,070	v		7,070	, , , , , , , , , , , , , , , , , , ,	-		*	27,200	1001
Lights	1,729	0		1,729	8.52		·		0	0.
People	311	v		311	1.53				. 0	_
Misc	0	0	0	0	0.00		0 0.00		Ô	0.
Sub Total==>	2.040	. 0	0	2,040	10.05				Ô	0.
eiling Load	2,040	0	V	2,040	0.00	,			0	0.
utside Air	0	0	0	9,053	44.59		0 0.00	,	Ŏ	0.
up. Fan Heat	V	U	٧	142	0.70		0.00	•	0	0.
et. Fan Heat		0		0	0.00		0.00		0	0.
uct Heat Pkup		0		Ů	0.00		0.00		0	0.
V/UNDR Sizing	0	v		Ü	-0.00 ×		0 -0.00		0	-0.
xhaust Heat	V	, 0	(0	0.00		0.00		0	
erminal Bypass		, 0	9	0	0.00		0.00		0	_
erminal bypass		V	Ų	V	0.00		V.00	r k	v	٧.
rand Total==>	11,110	0	Ò	20.306	100.00		1 100.00	-19.268	-19,268	100.
	,			,		,,	,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,	
								^ *	AREAS	
- P		Sens Cap.						Gross Total		st) (%
(Tons)			(cfm)			_	g F Grains		544 .	
in Clg 1.7									0	
x Clg 0.0		0.0	0.		0.0		0.0 0.0	ExFlr	0	
t Vent 0.0		0.0	0	0.0	.0 0.0	0.0	0.0 0.0	Roof	544	0
tals 1.7	20.3							Wall	550	72
HEATI	NG COIL SEL	ECTION		AIR	FLOWS (cfo)	ENGINEERING	G CHECKS	TEMPERATUR	ES (F)-
Capaci					Cooling	Heating	Clg % OA	36.0	Type Cl	
(Mbh			-	Vent	360	0	Clg Cfm/Sqft		SAD8 66	_
in Htg -19	•	000 68.0	85.7	Infil	198	198	Clg Cfm/Ton		Plenum 75	
	.0	0 0.0	0.0	Supply	1,000	1,000	Clg Sqft/Ton		Return 75	
_		000 45.0	66.1	Mincfm	0	0	Clg Btuh/Sqf		Ret/OA 80	
heat 0		0. 0.0	0.0	Return	1,000	1,000	No. People		Runarnd 75	
					-				•	
	١٨	0 0.0	U II	FYDAIICT	360	- ()	MI.O & DR	U. U	rn neith o	. 0 - 0
midif 0		0 0.0	0.0	Exhaust Rm Exh	360 0	- 0	Htg % OA Htg Cfm/SqFt			.0 0

System 10 Peak SI - SINGLE ZONE

******	*******	******								CONTRACTO DEN	TING COIL PEAK	
	t Time ==		Mo/Hr:	•				/Hr:	•	t	Mo/Hr: 13/ 1	
Outside	Air ==>	CA	DB/W3/HR:	91/ 74/105.	0		* 04 *	ADB: 8	39	; ;	OADB: 4	
		Space	Ret Air	Ret. Air	Net.	Percnt	•	pace	Percnt :	≭ Space Pe	ak Coil Peak	Percr
	ς,	ens.÷Lat.			Total			ible				
Envelope		(Btuh)			(Btuh)	(%)		tuh)	(%)			
Skylit		0	_		0			0	0.00		0 0	
Skylit		0			0	0.00		Ô	0.00		0 0	
Roof C			0		0	0.00		0			0 0	0.0
		4,550	•		4,550			-			0 0	0.0
Glass		807	0		807	2.22		820	4.92		98 -4,098	
Wall Co		552	62		614	1.69			3.60			
Partit		0	01		014	0.00			0.00		0 0	
	d Floor	٥			0	0.00			0.00		0 0	
Infilt		5,610			5,610			672			48 <i>-</i> 16,548	
Sub Tot		11,520	62		11,581			869			68 -22,672	
Internal		11,520	02	•	11,501		* *,	007	37.21		00 22,072	100.0
Lights	LUGUS	4,886	0		4,886	13.42		020	36.11		0 .0	0.0
People		853	V		853	2.34		769	4.61		0 0	
Misc		033	0	0	000	0.00		0	0.00		0 0	
	+^1~~\	5,739	-		5,739	15.77		788			0 0	0.0
		3,73 ? 10	-10		3,737	0.00		11	0.06		32 0	0.0
Ceiling (Outside 4		0	-10	0 ·	=	50.59		0	0.00		0 0	
Sup. Fan		U	V	V	683	1.88		V	0.00		0	
Ret. Fan			0		003	0.00			0.00			
ouct Heat			0		0	0.00			0.00		. 0	
)V/UNDR S		0	V		0	0.00		0			0 0	
Exhaust H	-	V	-17	0	-17			V	0.00		0	
Terminal			0		0	0.00			0.00		0	
i Ci minai	υγρασσ		V	٧	v	0.00	*		1.00		V	V. (
Grand Tot	tal==>	17,269	35	0	36,404	100.00	‡ 16,	668	100.00 *	-22,50	00 -22,672	100.0
				7110 0071 00	CENTION					,	40540	
	Total C			Coil Airfl	ELECTION Enterin					Gross Tota	AREAS al Glass (
	(Tons)			(cfm)								, , ,
in Clg										Part		
x Clg	0.0	0.0	0.0	0.		.0 0.		0.0	0.0	ExFlr	0	
t Vent	0.0	0.0	0.0	0		.0 0.0		0.0	0.0	Roof	0	0
itals	3.0	36.4								Wall	660	114
	HEATING	COTI SEL	ECTION		AIR	FLOWS (cf:	n)	F	NGINEERING	CHECKS	TEMPERATUR	FS (F)
	Capacity					Cooling	, Heating		% 0A	32.5	Type C1	
	(Mbh)	(cf:		-	Vent	780	0		Cfm/Sqft	1.56	SADB 68	
in Htg	-22.7		400 67.9	•	Infil	238	238	_	Cfm/Ton	791.13	Plenum 75	
x Htg	0.0	,	0.0		Supply	2,400	2,400		Sqft/Ton	506.65	Return 75	
eheat	-55.4		400 47.2		Mincfm	0	0	-	Btuh/Sqft		Ret/OA 80	
eheat	0.0		0. 0.0		Return	2,400	2,400	-	People	10	Runarnd 75	
midif	0.0		0. 0.0		Exhaust	780	- 0		% DA	0.0	•	.1 0.
ot Vent	0.0		0 0.0		Rm Exh	0	0	_	Cfm/SqFt	1.56		.0 0.
otal	-22.7		0 0.0		Auxil	0	0	-	Btuh/SqFt			.1 0.
	44.1											

System 11 Peak SZ - SINGLE ZONE

B L	at Time ==	*	Mo/Hr:					/Hr:]	7/22 *		Mo/Hr: 1	J/ I	
UUTS1de	Air ==>	04	DS/WB/HR:	91/ 74/105.	0		* 0	ADB:	79 *		OADB:	4	
		Space	Rat Oir	Ret. Air	Net	Percnt	* 5	pace	Percnt *	Space Pe	ak Coil	Doak	Percni
	Si	ens.+Lat.	Sensible			Of Tot			Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)	(%)		tuh)	(%) *	•			(\$
	e Solr	0	0	• •	0	0.00	•	0	0.00 *		0	0	0.00
•	e Cond	0	C		0	0.00		0	0.00 *		0	0	0.00
Roof C		0	0		0	0.00		0	0.00 *		0	0	0.00
Glass		Ô	0		0	0.00		0	0.00 *		0	0	0.00
Glass		0	0		0	0.00		0	0.00 *		0	0	0.00
Wall C		0	0		0	0.00		0	0.00 *		0	0	0.00
Partit		0	·		- 0	0.00		0	0.00 *		0	0	0.00
	d Floor	0		*	0	0.00		0	0.00 *		0	. 0	0.00
•	ration	0			0	0.00		0	0.00 *		0	0	60.74
	tal==>	0	0		0	0.00		0	0.00 *		0	0	60.74
Internal		v	·		•		*		. *		•	•	•••
Lights		13,815	0		13,815	10.50	* 18	,290	76.69 *		0	. 0	0.00
People		2,183	•		2,183	1.66		,560	23.31 *		0	Ó	0.00
Misc	•	0	0	0	0	0.00		0	0.00 *		0	0	0.00
	tal==>		0		15,998	12.15		,851	100.00 *		0	0	0.00
Ceiling		0	0		0	0.00		0	0.00 *		0	0	0.00
Outside		0	0		99,839			0	0.00 *		.0	Ö	0.00
Sup. Fan		•		•	15,787	11.99			0.00 *			0	0.00
Ret. Fan			0		0	0.00			0.00 *			0	0.00
Duct Hea			0		. 0	0.00			0.00 *			0	0.00
OV/UNDR		0	-		0	0.00		0	0.00 *		0	0	39.26
Exhaust	-	-	. 0	0	0	0.00	*		0.00 *			0	0.00
Terminal			0	0	0	0.00	*		0.00 *			0	0.00
	-76						*		*				
Grand To	tal==>	15,998	0	0	131,624	100.00	* 23	,851	100.00 *		0	0	100.00
				ITHE COTE SI	ELECTION						^ D F ^ S -		
					Enterin								f) (%)
	(Tons)		•	(cfm)					Grains	Floor	4,223		
Main Clg		•			82.0 71					Part			
Aux Clg	0.0	0.0	0.0	0.		.0 0.		0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	0		0 (
Totals	11.0	131.6								Wall	0		0 (
	HEATING	G COIL SEL	ECTION		AIR	FLOWS (cf	m)	8	NGINEERING	CHECKS	TEMPER	ATURES	(F)
	Capacity					Cooling	Heating		% OA	45.4	Type	Clg	
	(Mbh)	•		-	Vent	5,040	0	_	Cfm/Sqft	2.63	SADB	73.0	_
Main Htg	-1.2			-	Infil	0	0	_	Cfm/Ton	1011.97	Plenum	75.0	
Aux Htg	0.0	-	0 0.0			11,100	11,100		Sqft/Ton	385.00	Return	75.0	
Preheat	-395.9				Mincfm	0	0	-	Btuh/Sqft		Ret/OA	82.0	
Reheat	0.0		0. 0.0		Return	11,100	11,100		People	28	Runarnd	75.0	
			0 0.0		Exhaust	5,040	. 0		% 0A	0.0	Fn MtrTD		
	U.L												
Humidif Opt Vent	0.0 0.0		0 0.0		Rm Exh	0	0	-	Cfm/SqFt		Fn BldTD		

System 12 Peak SZ - SINGLE ZONE

Peaked a	t Time ==>		Mo/Hr:	7/14			*	Mo/Hr:	7/20	: 1	Mo/Hr: 13/ 1	
Outside	Air ==>	OAC		91/ 74/105.0	ı			OADB:	83	k	DAD8: 4	
		Space	Ret Gir	Ret. Air	Net.	Percnt	*	Space	Percnt ?	Space Peak	Coil Peak	Percn
	Sar	s.+Lat.				Of Tot		Sensible		Space Sens		Of To
Envelope				(Btuh)				(Btuh)		(Btuh)		
		0	0		0			(/	• •			
•		0	0		0			C			. 0	0.0
•	ond		0		3,816			4,109		-4,473		
	Sclar		0		0			(• 0		
Glass		ō	0		0			. 0	0.00	¢ 0	0	0.0
	cond		0		384			481	0.84	-1,693	-1,693	9.1
Partit		0	•		- 0						0	0.0
	d Floor	0			0			Č		¢ 0	, , 0	
	ration	0			0				0.00		-12,411	
		4,199	0		4,199				8.04		-18,576	
oub :: Internal		4,177	V		4,17	0.70		7,271	. 0.04		20,070	
internai Lights		£ 7.41	0		4 7A1	1.45		8,153			; 0	0.0
_		1,049	V		1,049			2,032			0	
			72 404	3,840				8,467			1	_
	4.1X				52,798			18,651			0	_
	tal==>	10,4/4	32,400		0						0	
	Load	0		_		71.07		(0.00		Ţ.	_
	Air	0	0	V	35,840			•	0.00		0	0.0
Sup. Far			٨		33,840				0.00		0	0.0
Ret. Far			0		0				0.00		0	0.0
	t Pkub .	77 0/0	•		-	7.73		33,869			0	_
	Sizing	33,869		0	33,669 ()			33,007	0.00		0	
Exhaust			, 0	0	. 0				0.00		0	0.0
lerminal	8ypass		0	U	. 0	0.00	*			r k	V	V.
A 1 T-	4 . 2 >	54.540	70 406	7 010	170 015	100.00		57 111		-18,576	-19 576	100
arand id	tal==>	54,540	32,480	3,040	430,043	100.00	7	37,111	100.00	10,570	10,570	100.
			coo	LING COIL SE	LECTION					A 7.4.1	AREAS	
	Total Ca	pacity	Sens Cap.	Coll Airti	Enteri	ud DR/MR/I	HK -	Leaving	DR/MR/HK	Gross Total		51) (%
	(Tons)	(Mbh)	(Mbh)	(ctm)	Deg F De	g F Grain	ns l	eg F veg	F Grains	Floor 1		
					89.5 7			10.5 6	7.4 99.0	Part		
ux Clg	0.0	0.0	0.0	0.			.0		0.0	Exflr	0	^
pt Vent	0.0	0.0	0.0	0	0.0	0.0	.0	0.0	0.0		,966	0
otals	36.5	438.0								Wall	495	0
	HEATING	COIL SEL	ECTION		AI	RFLOWS (c	fm)		ENGINEERIN	G CHECKS	TEMPERATUR	ES (F)-
	Capacity			Lvg	Type	Cooling	Hea	ating	Clg % OA	80.0	Type Clo	
	(Mbh)	(cfi	n) Deg F	Deg F	Vent	14,400		0	Clg Cfm/Sqft		SADB 72.	
ain Htg	-18.6	18,	000 68.0	68.9	Infil	0		178	Clg Cfm/Ton		Plenum 75	
ux Htg	0.0		0 0.0	0.0	Supply	18,000	1	18,000	Clg Sqft/Ton		Return 85	
reheat	-1,047.1	18,	000 16.8	70.3	Mincfm	0		0	Clg Btuh/Sqf		Ret/OA 89	.5 68
leheat	0.0	,	0. 0.0	0.0	Return	2,850	1	18,000	No. People	13	Runarnd 75	.0 68
lumidif	0.0		0 0.0		Exhaust	0	•	0	Htg % OA	0.0	Fn MtrTD 0	.5 0
						15 150		^	UL- OF- 10-FE	0.17	Co DIATO A	.3 0
pt Vent	0.0		0 0.0	0.0	Rm Exh	15,150		0	Htg Cfm/SqFt	9.16	Fn BldTD 0	. o v

System 13 Block FC - FAN COIL

nvelope Lo Skylite (Skylite (Roof Cond Glass So	Se	OAI Space	DB/WB/HR: 8	3/ 70/ 91.0)		*	nan	8: 8	3 *		OAD8:	4	
Skylite Skylite Cond Cond Glass So		Space					*		0. 0.	*				
Skylite Skylite Cond Cond Glass So			Ret. Air	Ret. Air	Net	Percnt	*	Spa	ce .	Percnt *	Space Pe	ak Coil	Peak	Perc
Skylite Skylite Cond Cond Glass So	nads	ns.+Lat.	Sensible	Latent	Total	Of Tot		Sensib.		Of Tot *			Sens	Of T
Skylite (Roof Cond Glass So	0440	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btul	h)	(%) *	(Btu	h) (1	Btuh)	(
Skylite (Roof Cond Glass So	Solr	0	0		0	0.00	*		0	0.00 *		0	0	0.
Roof Cond Glass So		0	0		0	0.00	*		0	0.00 *		0	. 0	0.
		108	0		108	20.93	*	10	08	28.50 *	-1	16	-116	99
	lar	0	0		0	0.00	*		0	0.00 *		0	0	0
Glass Con		0	0		0	0.00	*		0	0.00 *		0	0	0
Wall Con		0	0		0				0	0.00 *		0	0	0
Partition		0	·		. 0	0.00			0	0.00 *		0	0	0
Exposed 1		ō			0	0.00			0	0.00 *		0	. 0	0
Infiltra		0			0	0.00			0	0.00 *		0	0	0
Sub Total		108	0		108			. 17	80	28.50 *		•	-116	100
		100	V		100	40.74	*	10	VU	. *		10		100
ternal Lo	U 4U5	017	Λ.		216	41.96	-	າ	16	57.12 *		0	0	0
Lights		216	0			31.58			10 54	14.37 *		٨	0	0
People		163		٨	163							٥	0	
Misc	1	0	0	0	770				0	0.00 *		٨	۷	0
Sub Total		379	0	0	379			4	71	71.50 *		0	٥	
iling Lo		0	0		0				0	0.00 *		0	0	(
tsida Air		0	0	0	0				0	0.00 *		.0	0	0
p. Fan H					28					0.00 *			0	0
t. Fan H			0		0			•		0.00 *			0	0
ict Heat	•		0		0					0.00 *			0	(
/UNDR Si	-	0			0				0	0.00 *		0	0	0
haust He			, 0	0	0					0.00 *		•	0	(
rminal By	ypass		0	0	0	-0.00	* *			0.00 *			0	(
and Total	1==>	487	0	0	515	100.00	*	3	78	100.00 *		16	-116	100
			C00L	THE COTE OF	I FOTTON									
	Total C		Sens Cap.			ng DB/₩8/					Gross Tot		ass (st	
			(Mbh)			g F Grai	ns.	Deg F D	eg F	Grains	Floor	51		
			0.4								Part	0		
Clg	0.0	0.0	0.0	0.			0.0	0.0	0.0	0.0	ExFlr	0		
Vent	0.0	0.0	0.0	. 0			.0	0.0	0.0	0.0	Roof	51		0
als	0.0	0.5									Wall	. 0		0
	-HEATING	COIL SELE	ECTION		AIF	RFLOWS (c	fm)-		EI	NGINEERING	CHECKS	TEMPE	RATURES	3 (F)
	Capacity				Type	Cooling	}	leating .	Clg	% DA	0.0	Type	Clg	ł
	(Mbh)	(cfr			Vent	0		0	Clg	Cfm/Sqft	3.92	SADB	73.3	3 6
n Htg	-0.1		200 68.0		Infil	0		0	_	Cfm/Ton	4658.06	^ Plenum	75.0	
Htg	0.0		0 0.0		Supply	200		200		Sqft/Ton	1187.81	Return	75.0	
eheat	-1.1		200 68.0		Mincfm	0		0		Btuh/Sqft		Ret/OA	75.0	
neat	0.0		0. 0.0	0.0	Return	200		200	-	People	0	Runarnd	75.0	
nidif	0.0		0. 0.0	0.0	Exhaust	0		- 0		% OA	0.0	Fn MtrT		
t Vent	0.0		0 0.0	0.0	Rm Exh	0		0		Cfm/SqFt	3.92	Fn BldT		
tal	-0.1		v v.v	V . V	Auxil	0		0	_	Btuh/SqFt		Fn Fric		

System 14 Block RAD - RADIATION

Peaked a	t Time ==>		Mo/Hr: (* 1	lo/Hr:	0/0 *		Mo/Hr: 13	1	
Outside	Air ==>	OA	D8/W8/HR:	0/ 0/ 0.0) .		*	OAD8:	0 *		OADB:	‡	
		Space	Ret. Air	Ret. Air	Net.	Percnt	•	Space	Percnt *		ak Coil P	eak f	Perci
	Se	ns.+Lat.	Sensible		Total			sible	Of Tot *	-			Of To
Envelope		(Btch)	(Btuh)		(Btuh)			Btuh)	(%) *				(!
		0		, ,	0	0.00		0	0.00 *			0	0.0
-	ε Cond	0	0		0	0.00		0	0.00 *		0	Ō	0.0
Roof C		0			0	0.00		0		-8,1			
Glass		٥	0		0	0.00		0	0.00 *				0.
Glass		n	0		0	0.00		0		-23,2			
Wall C		. 0	0		0	0.00		0	0.00 *	-	07 -19,		
Partit		. 0	V		- 0	0.00		0	0.00 *				ó.
	d Floor	٥			0	0.00		0	0.00 *			0	0.
		0			٥	0.00		0	0.00 *		88 -151,		
	ration	۸	0		0	0.00		0	0.00 *		30 -202,		100.
	tal==>	V	U		V	0.00	*	V	. *		-202,	,,,,	100.
nternal Lighte		۸	0		0	0.00		0	0.00 *		0	0	0.
Lights		. 0	U		0	0.00		0	0.00 *		0	0	0.
People		0	0	0	0	0.00		0	0.00 *		0	0	0.
Misc	4-1	0	_		0	0.00		0			0	0	0.
	tal==>	Ų	0	0	0			_	0.00 *		•		
iling		0	0	Δ	•	0.00		0	0.00 *			0	0
tside		0	0	0	0	0.00		0	0.00 *		0	0	0.
p. Fan			^		0	0.00			0.00 *			0	0.
t. Fan			0		0	0.00			0.00 \$			0	0
	t Pkup		0		0				0.00 *			0	0.
	Sizing	0	2	^	0	0.00		0	0.00 - *		0	0	0
	Heat	4.	, 0		0				0.00 *			0	0.
erminai	B ypass		0	С	C	0.00			0.00 *			0	0.
rand To	tal==>	0	0	ũ	0	0.00	*	0	0.00 *	-210,4	18 -202,	353 1	100.
			cool	ING COTE SE	FOTTON						ARFAS		
			Sens Cap.									(sf)	
	(Tons)	(Mbh)	(Mbh)	(cfn)	Dag F Deg	g F Grai	ns Deg F	Deg 8	Grains	Floor	9,084		
n Clg	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Part	0	,	
Clg	0.0	0.0	0.0	0.			.0 0.0			ExFlr	0		
Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Roof	3,164	(0
als	0.0	0.0								Wall	6,046	645	5
	HEATING	COIL SEL	ECTION		AIF	RFLOWS (c	fm)		ENGINEERING	CHECKS	TEMPERA	TURES ((F)·
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heating	. C1	g % OA	0.0	Type	Clg	H
	(Mbh)	(cf	m) Deg F	Deg F	Vent	0		0 C1	g Cfm/Sqft	0.00	SADB	0.0	61
n Htg	-202.9		0 0.0	0.0	Infil	0	2,17		g Cfm/Ton	0.00	Plenum	0.0	67
Htg	0.0		0.0	0.0	Supply	0	-		g Sqft/Ton	0.00	Return	0.0	6
_	0.0		0.0		Mincfm	0			g Btuh/Sqft		Ret/OA	0.0	6
heat	0.0		0. 0.0		Return	0			. People	0	Runarnd	0.0	68
						-					-		
neat			0 0.0	0.0	Exhaust	0	•	0 H1	a % DA	0.0	Fn MtrID	0.0	- {
eheat neat nidif t Vent	0.0		0 0.0	0.0 0.0	Exhaust Rm Exh	0	•		g % OA g Cfm/SqFt	0.0 0.00	Fn MtrID Fn 81dTD	0.0	0

BUILDING U-VALUES - ALTERMATIVE 4
COMBINED ECGS

BUILDING U-VALUES

						Roo	m U-Val	ues				Room	Room
						(Btu	/hr/sqf	ft/F)				Mass	Capac.
	Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
	Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
	1	LIQUOR STORE	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	13.3	2.67
	Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
٠.	System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.3	2.67
	: 2	RAD ONLY	0.144	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
	Zone	2 Total/Ave.		0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
•	System	2 Total/Ave.		0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	101.9	22.83
	3	ATTIC	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
	Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	. 23.3	8.65
	Sys tem	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
	4	OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
	Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
	System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
		PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
	Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	.17.0	6.01
	System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
	6	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
,	Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
	System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
	7	MECH ROOM	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
	Zone	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
	System	7 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.1	15.93
	8	LOBBY	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
٠	Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
	System	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
, i	7	PRIVATE DINING	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
	20110	9 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
	System	9 Total/Ave. DINING ROOM	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
	10		0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
	Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
	System 11	10 Total/Ave. BALL ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22 3.70
			0.000	0.000		0.000	0.000	0.000	0.000		0.317	6.2	
	Zone	<pre>11 Total/Ave. 11 Total/Ave.</pre>			0.000			0.000				6.2	3.70 3.70
	System	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	6.2 40.1	9.02
	Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
	System	12 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.053	0.000	40.1	9.02
		KITCHEN OFFICE	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
	Zone	13 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	22.2	5.22
	System	13 Total/Ave.	0.000	0.000	0.000	0.000	0.036	0.000	0.000		0.000	22.2	5.22
•	-	ATTIC	0.000	0.000	0.000	0.000	0.030	0.550	0.563	0.058	0.000	23.3	8.65
	Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	23.3	8.65
		OFFICES	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
		4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.550	0.563	0.058	0.000	56.1	15.68
	Zone	PARTY ROOMS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.000	17.0	6.01
		5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.053	0.317	17.0	6.01
	Zone	LOUNGE	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
	Zone	6 Total/Ave.		0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	93.3	22.79
		LOBBY	0.000	0.000	0.000					0.058		67.4	17.13
	Ü	E0001	V. VVV	V. V.V	4.000	0.000	V. UUU	0.000	4.500	0.000	A * A T (0714	

BUILDING U-VALUES - ALTERNATIVE 4
COMBINED ECOS

------ BUILDING U-VALUES------

					Roc	om U-Val	ues				Room	Room
					(Btu	ı/hr/sqi	ft/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	₩indo	Windo	Wall	Ceil.	sqft)	sqft/F)
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	67.4	17.13
9	PRIVATE DINING	0.000	0.000	0.000			0.550				84.6	18.47
Zone	<pre>9 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.036	0.550	0.563	0.053	0.000	84.6	18.47
. 10	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
Zone	<pre>10 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.058	0.317	54.2	14.22
System	14 Total/Ave.	0.000	0.000	0.000	0.000	0.040	0.550	0.563	0.057	0.317	52.8	14.09
Buildin	g				0.000				0.057	0.317	48.7	12.67

BUILDING AREAS - ALTERNATIVE 4 COMBINED ECOS

BUILDING AREAS

														14.
					Floor	Total		Exposed						
			Munk	nr nf.	Area/Dupl		Contition		Chuliast	Ole)	Not Doof	Hindow	Min	Net Mell
,	000			icate	•		Partition		Skylight		Net Roof	Window		Net Wall
	Room	N			Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	
Nun	mber	Description	111	KM	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
	1	LIQUOR STORE	1	1	1,073	1,073	ô	0	0	0	0	0	0	0
Zor		1 Total/Ave.	-	•		1,073	0	0	0	0	0	0	Ö	0
	stem	1 Total/Ave.				1,073	0	0	0	0	0	0	Ö	Ö
Uy S		RAD ONLY		1	2,856	2,856	342	0	0	0	2,153	305	12	2,148
700		2 Total/Ave.		•	2,030	2,856	342	0	0	0	2,153	305	12	2,148
Zon						2,855	342	0	0	0		305	12	
oy 5	sten	2 Total/Ave.		1	1 704			-	0	0	2,153			2,148
7		ATTIC		1	1,354	1,354	0	0	-		1,354	14	1	1,372
Zor		3 Total/Ave.				1,354	0	0	0.	0	1,354	14	1	1,372
Sys	stem	3 Total/Ave.				1.354	0	0	0	0	1,354	14	1	1,372
	4			1	1,266	1,206	0	0	0.	0	1,266	71	5	1,243
	ne	4 Total/Ave.				1,265	0	0	0	0	1,266	71	5	1,243
Sys	stem	4 Total/Ave.				1,266	. 0	Û	0	0	1,266	71	- 5	1,243
	5	PARTY ROOMS	1	1	1,748	1,748	0	0	0	0	0	153	36	267
Zon	ne	5 Total/Ave.				1,748	0	0	_ 0	. 0	. 0	. 153	36	267
Sys	stem	<pre>5 Total/Ave.</pre>				1,748	C	0	0	0	0	153	36	267
	6	LOUNGE	1	1	1.564	1,564	0	C	0	0	0	146	13	1,009
Zon	ne	6 Total/Ava.				1,564	0	0	0	0	0	146	13	1,009
Sys	stem	6 Total/Ave.				1,564	0	0	. 0	0	. 0	146	13	1,009
	7	MECH ROOM	1	1	469	469	108	0	0	0	0	0	0	0
Zon	ne	7 Total/Ave.				469	108	0	0	0	0	0	0	0
Sys	stem	7 Total/Ave.				469	108	0	0	0	0	0	0	0
•		LOBBY	1	1	1,071	1,071	0	0	0	0	0	75	13	486
Zon	ne	8 Total/Ave.			ŕ	1,071	0	0	. 0	0	0	75	13	486
	stem	8 Total/Ave.				1,071	0	0	0	0	0	75	13	486
. ","	9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	72	13	478
Zon		9 Total/Ave.	-	-	• • • • • • • • • • • • • • • • • • • •	544	0	0	. 0	0	544	72	13	478
	stem	9 Total/Ave.				544	0	Ö	Ö	0	544	72	13	478
o _j s		DINING ROOM	1	1	1,537	1,537	0	0	0	0	. 0	114	17	546
7nn	ne	10 Total/Ave.	1	-	1,507	1,537	0	Ö	, 0	0	0	114	17	546
	tem	10 Total/Ave.				1,537	0	0	0	0	0	114	17	546
		BALL ROOM	1	1	4 227		0	٨	0	٨	0	. 0	0	J40
			i	1	4,223	4,223	0	0		٥				0
	18	11 Total/Ave.				4,223	. 0	- 0	0	0	0	0	0	. 0
	tem	11 Total/Ave.			1.0//	4,223	. 0	0	-	0	1.0//	0	0	
		KITCHEN	i	1	1,966	1,966	Û	0	0	0	1,966	•	0	495
	S	12 Total/Ave.				1,966	0	V	0	0	1,966	0	0	495
	stem	12 Total/Ave.	4			1,966	0	0	0	0	1,966	0	0	495
		KITCHEN OFFICE	1	1	51	51	0	0	0	0	51	0	0	0
	ne	13 Total/Ave.				51	0	0	0	0	51	. 0	0	0
Sys	stem	<pre>13 Total/Ave.</pre>				51	0	- 0	0	0	51	0	0	0
		ATTIC	1	ĺ	1,354	1,354	0	0	0	0	1,354	14	1	1,372
Zon	18	3 Total/Ave.				1,354	0	0	0	0	1,354	14	1	1,372
	4	OFFICES	1	1	1,266	1,266	0	0	0	0	1,266	71	5	1,243
Zon		<pre>4 Total/Ave.</pre>				1,266	0	0	0	0	1,266	71	5	1,243
	5	PARTY ROOMS	1	1	1,748	1,748	0	0	0	0	0	. 153	36	267
Zon		5 Total/Ave.			•	1,748	0	0	0	0	0	153	36	26 7
	6	LOUNGE	1	1	1,564	1,564	0	0	0	0	0	146	13	1,009
Zen	1e	6 Total/Ave.			-	1,564	0	0	0	0	0	146	13	1,009
		LOBBY	1	1	1,071	1,071	0	0	. 0	0	0	. 75	13	486
					•	•								

BUILDING AREAS - ALTERNATIVE 4 COMBINED ECOS

----- BUILDING AREAS -----

Room Number	Description		er of ica te Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win- /Wl (%)	Net Wall Area (sqft)
Zone	8 Total/Ave.				1,071	0	0	0	C	0	75	13	486
9	PRIVATE DINING	1	1	544	544	0	0	0	0	544	72	13	478
Zone	9 Total/Ave.				544	0	0	0	0	544	72	13	478
-10	DINING ROOM	1	1	1,537	1,537	0	0	0	0	0	114	17	546
Zone	10 Total/Ave.				1,537	0	0	0	0	0	114	17	546
System	14 Total/Ave.				9,084	0	0	0	0	3,164	645	11	5,401
Buildin	g				28,806	450	0	0	0	10,498	1,596	11	13,444

ASHRAE 90 ANALYSIS - ALTERNATIVE 4 COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.039 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.109 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.080 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.10 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 9.95 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 COMBINED ECOS

System Totals

Percent	Cool	ling Loa	nd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
De sign	Cap.			Capacity		Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(8tuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	4.4	85	5,304	-131,465	32	1,120	2,358.8	29	2,555	0.0	0	0
5 - 10	8.9	2	140	-262,931	45	1,611	4,717.6	0	0	0.0	0	0
10 - 15	13.3	5	312	-394,396	11	403	7,076.4	0	0	0.0	0	0
15 - 20	17.7	4	244	-525,862	12	419	9,435.2	0	0	0.0	0	0
20 - 25	22.2	3	205	-657,327	0	0	11,794.0	0	0	0.0	0	0
25 - 30	26.6	0	0	-788,792	0	0	14,152.8	0	0	0.0	0	0
30 - 35	31.0	0	0	-920,258	0	0	16,511.6	0	. 0	0.0	0	0
35 - 40	35.4	0	0	-1,051,723	0	0	18,870.3	0	0	0.0	0	0
40 - 45	39.9	. 0	0	-1,183,189	0	0	21,229.1	0	0	0.0	0	0
45 - 50	44.3	0	0	-1,314,654	0	0	13,587.9	0	0	0.0	0	0
50 - 55	48.7	0	0	-1,446,120	0	0	25,946.7	0	0.	0.0	0	0
55 - 60	53.2	0	0	-1,577,585	0	0	28,305.5	0	0	0.0	0	0
60 - 65	57.6	0	0	-1,709,050	0	0	30,664.3	0	0	0.0	0	0
65 - 70	62.0	0	0	-1,840,51c	0	0 '	33,023.1	0	0	0.0	0	0
70 - 75	66.5	0	0	-1,971,981	0	0	35,381.9	0	0	0.0	0	0
75 - 80	70.9	0	ý	-2,103,447	0	0	37,740.7	C	0	0.0	0	0
80 - 85	75.3	0	. 0	-2,234,912	0	0	40,099.5	0	0	0.0	0	0
85 - 90	79.8	0	0	-2,366,377	0	0	42,458.3	71	6,205	0.0	0	0
90 - 95	84.2	0	0	-2,497,843	0	0	44,817.1	0	0	0.0	0	0
95 - 100	88.6	Û	0	-2,629,308	0	0	47,175.9	0	0	0.0	0	0
Hours Off	0.0	0	2,555	0	0	5,207	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

				ar ar be ar ter	8 U I I	LDI	N G	TEM	PER	ATU	RE P	R O F	ILE	\$			~~~~~		
Temperature Range	1	2	3	4	5	6	7	8		Zone Na 10		12	13	 3	4	 5	6	8	9
(F)																			-
Max. Temp.	38.0	92.3	78.7	78.5	80.0	78.5	71.2	78.6	78.5	78.8	79.9	96.7	80.0	121.9	119.3	161.8	126.4	140.8	115.3
Mo./Hr.	1 1	8 22	7 24	7 1	7 5	7 4	9 16	7 4	7 3	7 5	6 5	7 15	7 5	8 22	8 22	8 22	9 22	9 22	8 22
Day Type	1	1	1	2	1	1	4	1	1	1	2	1	1	1	1	1	5	3	1
									Nu	nber o	f Hours	3			,				
Above 100	0	0	0	0	0	0	0	0	0	0	0	0	0	2,944	2,928	4,331	2,844	3,497	2,640
95 - 100	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	85	462	180	288
90 - 95	0	868	0	0	0	0	0	0	0	0	0	138	0	124	136	147	245	223	52
85 - 90	0	1,276	0	0	0	0	0	0	0	0	0	778	0	214	196	618	267	184	213
80 - 85	0	784	0	0	0	0	0	0	0	0	0	1,174	. 0	270	552	675	138	683	431
75 - 80	0	136	2,744	3,373	3,672	3,036	0	3,672	2,823	3,321	2,801	820	4,107	34	316	686	859	289	488
70 - 75	0	948	928	299	0	636	1,563	51	849	436	658	213	4,653	308	193	1,076	245	800	189
65 - 70	0	4,343	3,690	4,334	3,961	2,379	3,387	1,973	3,330	2,836	443	858	0	3,734	3,792	1,139	3,672	2,899	3,903
60 - 65	0	405	1,102	754	1,100	989	3,810	585	1,603	1,333	695	878	0	776	647	3	28	5	556
55 - 60	0	. 0	296	0	27	1,078	0	1,271	155	778	782	576	0	236	0	0	0	0	0
50 - 55	0	0	0	0	0	642	0	936	0	6	872	615	Q.	0	0	0	0	0	0
Below 50	8,760	0	0	0	0	0	0	272	0	0	2,509	2,710	0	0	. 0	0	0	0	0
Min. Temp.	38.0	63.2	56.2	60.9	59.2	50.6	60.2	47.2	57.4	55.0	33.9	30.1	67.9	56.2	60.9	64.3	64.8	65.0	61.8
Mo./Hr.	1 1	2 6	2 6	2 6	2 11	2 10	3 20	2 8	2 7	2 10	2 10	2 8	1 6	2 6	2 6	1 6	2 6	2 6	2 6
Day Type	1	1	1	, 1	5	5	5	5	5	5	4	4	1	1	1	1	4	4	1

10

Range

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

------BUILDING TEMPERATURE PROFILES-----

(F)								
Max. Tamp.	146.8							
Mo./Hr.	9 22							
Day Type	3	•						
			 	. Number of	Hours		 	
Above 100	3,649							
95 - 100	204							
90 - 95	167							
85 - 90	618							
80 - 85	418							
75 - 80	96					+		
70 - 75	1,189							
65 - 70	2,419							
60 - 65	0							
55 - 60	0							
50 - 55	C						•	
Below 50	0					•		
Min. Temp.	65.1							
Mo./Hr.	2 6						÷	
Day Type	4							

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	HOT WTR On Peak (Therm)	STEAM DMND On Peak (Thrm/hr)	HOT W DMND On Peak (Thrm/hr)
Jan	53,363	107	92	839	0	3
Feb	48,170 .	107	83	883	0	3
March	52,401	114	92	455	0	3
April	47,662	123	89	141	0	3
May	46,412	139	0	0	0	0
June	50,596	146	0	0	0	0
July	60,511	153	0	0	. 0	0
Aug	52,776	147	0	0	0	0
Sapt	45,409	143	0	0	0	0
Oct	48,977	121	69	39	. 0	2
Nov	48,656	118	89	229	0	2
Dec	53,308	107	92.	624	0	3
Total	608,241	153	607	3,209	C	3

Building Energy Consumption = 85,314 (Btu/Sq Ft/Year) Source Energy Consumption = 233,883 (8tu/Sq ft/Year)

Floor Area =

28,806 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION ------

le f	Equip					Mon	thly Cons	sumption						
	Coda	Jan	fab	Mar	Apr	May	Juna	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	15067	13609	15067	14581	15067	14581	15067	15067	14581	15067	14581	15067	177,399
	PK	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	MISC LD	7110	4.5	7// 6	~	=140		~	W 14 M					
	ELEC PX	7412 14.1	6694 14.1	7412 14.1	7173 14.1	7412 14.1	7173 14.1	7412 14.1	7412 14.1	7173 14.1	7412 14.1	7173 14.1	7412 14.1	87,266 14.1
	r n	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
2	MISC LD	۸	۸	٨	0	^	۵	^	^	۵	Δ.	۸	Δ.	
	GAS PK	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			V. 0	v. v	V.V	0.0	0.0	0.0	v. •	0.0	0.0	0.0		0.
3	MISC LD OIL	Ô	C	0	0	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
4	MISC LD P STEAM	0	ė	0	0	0	0	0	Û	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	MIDD ID													•
)	MISC LD P HOTH20	0	Ś	. 0	0	0	0	0	0	0	Ō	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P CHILL	0	Ü	0	Ô	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
l	EQ1161		AIR-	-CLD COND) 00mp ki	15 TONS								•
	ELEC	0	ŷ	Q	Q	. 0	0	0	0	0	0	0	0	. (
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ5200			ENSER FA										
	ELEC	0	0	0	Û	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ5303		CONT											
	ELEC PK	0.0	0.0	0 0.0	0.0	0.0	0.0	0	0.0	0.0	0 0.0	0.0	0.0	(
	γλ	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ1100S			CLD RECI					-					
	ELEC PK	0.0	0 0.0	0 20.2	274	1031 22.0	3979 24.1	83 38 28 .1	4398 2 4 .4	1338 22.2	966 20.2	50	0	20,375
	rn	0.0	0.0	20.2	20.2	22.0	24.1	20.1	24.4	44.4	20.2	20.2	0.0	28.
	EQ5200			ENSER FA		***						_		
	ELEC PK	0.0	0 0.0		11 0.2	70 0.5	278 1.7	594 2.3	306 1.8	91 1.5	40 0.5	2 0.1	- 0 0.0	1,39
	ΓN	0.0	٧.٧	V.1	V . Z	۷. ۶	1.1	7.0	1.0	1.3	0.5	V.1	0.0	2.3
2	EQ5001		CHIL	LED WATE	R PUMP (C. V.								

1 EQ4003

FC CENTRIF. FAN C.V.

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

307 910 1318 1572 1375 984 981 ELEC 0 0 0 89 0 7,538 0.0 0.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 0.0 PK 3.0 CONTROLS 2 EQ5303 ELEC 0 0 0 31 91 133 158 138 99 99 9 0 758 0.0 0.3 0.3 0.3 0.3 PΚ 0.0 0.3 0.3 0.3 0.3 0.3 0.0 0.3 TRANE HT-PMP W-DEMAND DEFROST 3 EQ1281 ELEC 951 848 1007 805 0 89 312 86 0 578 973 967 6,617 PΚ 2.1 2.1 2.1 2.1 0.0 1.1 1.7 0.7 2.1 2.1 2.1 2.1 1.1 3 E05215 CONDENSER FANS ELEC 0 0 0 13 0 0 0 0 73 0 0 46 13 PK 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.1 0.0 0.0 0.2 CONTROLS 3 EQ5308 DATA 53 48 53 51 0 18 39 21 0 41 51 53 427 PK 0.1 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 3 EQ5350 HEAT PUMP DEMAND DEFROST CYCLE 0 ELEC 0 0 0 0 0 14 12 7 0 6 14 52 0.0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 TRANE HT-PMP W-DEMAND DEFROST 4 EQ1281 ELEC 1705 939 234 22 1521 1806 0 662 281 648 1288 1734 10,837 3.8 3.8 2.1 PK 3.8 3.8 0.0 3.1 2.2 1.7 3.8 3.8 3.8 3.8 4 EQ5215 CONDENSER FANS ELEC 0 0 Û 99 3 C 0 35 42 0 0 0 180 PΚ 0.0 0.0 0.0 0.0 0.0 0.3 0.4 0.3 0.3 0.1 0.0 0.0 0.4 4 EQ5308 CONTROLS 27 -ELEC 53 48 53 34 0 24 46 8 45 53 23 412 PK 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 4 EQ5350 HEAT PUMP DEMAND DEFROST CYCLE ELEC 24 21 12 0 0 0 0 0 0 0 24 93 11 0.0 0.0 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5 EQ1101L HR AIR-CLD RECIP >15 TONS ELEC 0 0 0 0 229 1279 3311 1357 201 0 0 0 6,378 PK 0.0 0.0 0.0 0.0 22.4 23.2 24.0 23.3 22.5 0.0 0.0 0.0 24.0 5 EQ5200 CONDENSER FANS 109 277 ELEC 0 0 0 0 20 115 0 0 0 17 538 PK 0.0 0.0 0.0 0.0 0.8 1.0 1.4 1.0 1.0 0.0 0.0 0.0 1.4 5 EQ5001 CHILLED WATER PUMP C.V. 0 0 0 626 1110 728 0 0 2,980 ELEC 0 262 254 0 0.0 0.0 0.0 0.0 3.0 3.0 3.0 3.0 0.0 0.0 PK 3.0 0.0 3.0 5 EQ5303 CONTROLS ELEC 0 0 0 0 26 63 112 73 26 0 0 . 0 300 0.3 0.3 0.0 PK 0.0 0.0 0.0 0.0 0.3 0.3 0.3 0.0 0.0 0.3

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

CUM	STACH ECOS													
	ELEC PK	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.									
-	ELEC	650	587		629	650	629	650	650	629	650	629	650	7,649
	PK	1.2	1.2		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
3	EQ4003		FC	CENTRIF.	FAN C.V.									•
	ELEC	10	9	10	10	10	10	10	10	10	. 10	10	10	119
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ4003		FC		FAN C.V.									
	ELEC	5	4	_	4	5	4	5	5	4	5	4	5	53
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	EQ4003				FAN C.V.									
	ELEC	944	853		914	944	914	944	944	914	. 944	914	944	11,114
	PK	1.8	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
5	EQ4003				FAN C.V.						1.74			
	ELEC	0	0		167	126	164	197	175	133	195	115	10	1,338
	PK	0.2	0.1	0.7	0.8	0.6	0.6	8.0	0.6	0.6	0.8	0.8	0.2	0.8
6	EQ4003				FAN C.V.						•			
	ELEC	1346	1216		1302	1346	1302	1346	1346	1302	1346	1302	1346	15,847
	PK	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
6	EQ4003				FAN C.V.									
	ELEC	42	40	43	41	50	44	43	44	44	38	38	40	506
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	EQ4003				FAN C.V.				, .					
	ELEC	. 45	41	45	44	45	44	45	45	44	45	44	45	531
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.1	0.1	0.1
8	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	447	403	447	432	447	432	447	447	432	447	432	447	5,258
	PK	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
9	EQ4003				FAN C.V.									
	ELEC	45	41		44	45	44	45	45	44	45	44	45	531
	PK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
10	EQ4003				FAN C.V.				4.000					
	ELEC	217	196		210	217	210	217	217	210	217	210	217	2,550
	PK	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11	EQ4003				FAN C.V.				-				•	
	ELEC	5007	4523		4846	5007	4846	5007	5007	4846	5007	4846	5007	58,957
	PK	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
12			FC		FAN C.V.									
	ELEC	11368	10268			11368	11001	11368	11368	11001	11368	11001	11368	•
	PK	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
12	EQ4003		FC	CENTRIF.	FAN C.V.									

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

	ELEC PK	1025 1.9	926 1.9	1025 1.9	992 1.9	1025 1.9	992 1.9	1025 1.9	1025 1.9	992 1.9	1025 1.9	992 1.9	1025 1.9	12,070
13	EQ4003		EC C	ENTRIF.	FAN C V									
	ELEC	9	8	9	9	9	9	9	9	9	9	9	9	106
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								
	P HOTH20	839	883	455	141	0	0	0	0	0	39	229	624	3,209
	PK	3.5	3.5	3.4	3.0	0.0	0.0	0.0	0.0	0.0	1.7	2.5	3.3	3.5
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	432	390	384	147	0	0	0	0	0	60	153	432	1,998
	ÞΚ	0.8	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.8
2	EQ2261		ELEC	TRIC RAD	IATION									
	ELEC	6476	5849	5367	2649	0	0	0	0	0	1699	3618	6369	32,027
	PK	12.3	12.3	12.3	12.3	0.0	0.0	0.0	0.0	0.0	12.3	12.3	12.3	12.3
3	EQ2101		PURC	HASED DI	STRICT S	TEAM								
	P STEAM	92	83	92	89	0	0	0	0	0	69	89	92	607
	PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	6	5	6	6	0	0	0	0	0	5	6	6	40
	PK · ·	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	12	11	12	12	0	0	0	0	0	9	12	12	82
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 COMBINED ECOS

	UTILITY PEAK	CHE	CKSUM
Utility ELECTRIC DEMAND			
Peak Value 153.4 Yearly Time of Peak 1			
Hour 17 Month 7			
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)	
Cooling Equipment			
3 EQ1281 4 EQ1281	AIR-CLD RECIP 25-45 TONS TRANE HT-PMP W-DEMAND DEFROST TRANE HT-PMP W-DEMAND DEFROST HR AIR-CLD RECIP >15 TONS	32.5 1.8 3.2 28.1	21.18 1.15 2.08 18.33
Sub Total		65.6	42.75
Sub Total		0.0	0.00
Air Moving Equipment			
3 4 5 6 8 9 10 11	SUMMATION OF FAN ELECTRICAL DEMAND	0.0 1.3 1.8 0.7 2.7 0.8 0.1 0.4 9.5 23.5	0.82 1.17 0.43 1.78 0.55 0.06 0.27
Sub Total		40.8	26.61
Sub Total		0.0	0.00
Miscellaneous			
Lights Base Utilities Misc Equipment Sub Total		33.0 0.0 14.1 47.0	21.48 0.00 9.17 30.65
Grand Total		153.4	100.00